How to Use TG700 Signal Library

This document "How to Use TG700 Signal Library" describes the use of TG700 signal library provided in CD-ROM (Version 4.0 and after) of TG700 Signal Generator Platform Software Library.

Test signals of TG700 are created utilizing SDP2000 Signal Generator Program similar to that of TG2000. Because of the differences in hardware between TG700 and TG2000, however, there may be differences in the format definitions or in the signal files of SDP2000 even if format names and/or test signal names, etc. are same. TG700 signal library consists of the standard DNL files for each of modules and the various test signal files to be used by SDP2000. For verification purpose of test signal parameters, in addition, SDP2000 (READER) specifically set up for use on TG700 is provided.

The standard DNL files designed for TG700 are tailored best to TG700, and the standard DNL files designed for TG2000 are tailored best to TG2000, respectively. If used DNL files designed for TG700 on TG2000, or when used DNL files designed for TG2000 on TG700, various restrictions are imposed. In the following description, you can find (a) verification procedure of test signal parameters utilizing TG700 signal library, (b) settings to SDP2000 for TG700, and (c) various restrictions to TG700 test signals, etc.

Verification Procedure of Test Signal Parameters

SDP2000 (READER) specifically set up for TG700 is contained under Signal Library directory on the CD-ROM. By executing this SDP2000 from the CD-ROM, simple verification of the test signal parameters is possible with the following steps.

STEP 1 Select CD-ROM drive from Windows Explorer. With this, the content under Signal Library directory in the CD-ROM is displayed (refer to Figure 1).

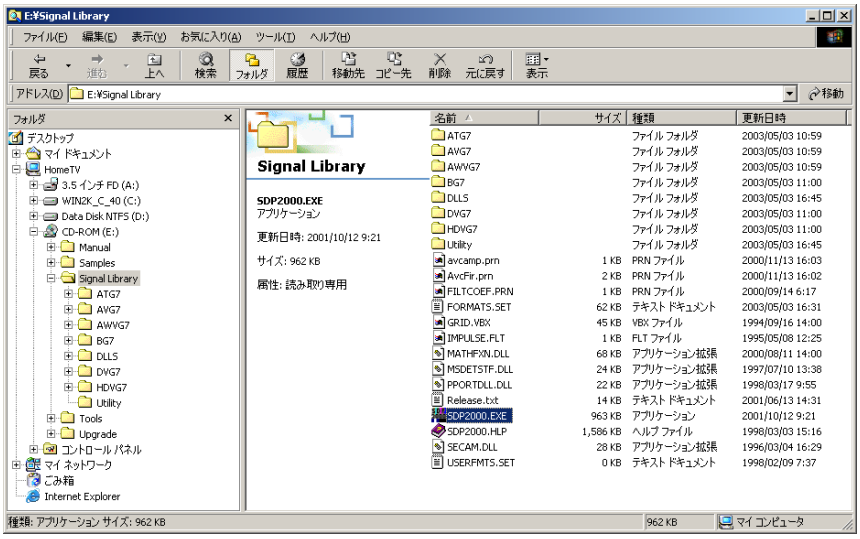

Figure 1 Signal Library / SDP2000.EXE in CD-ROM

STEP 2 Select then execute SDP2000.EXE. SDP2000 Opening Window appears first, and the window shown below opens (refer to Figure 2).

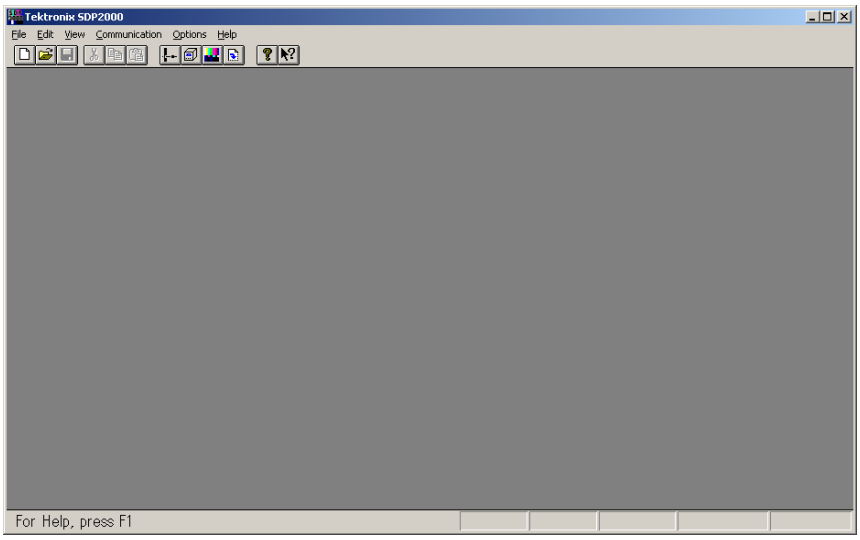

Figure 2 SDP2000.EXE Start-Up Window

At the first execution SDP2000.EXE, the following association of files is performed. At the next system start and after, SDP2000 automatically starts up and the files open by simply selecting / double-clicking on a file with the mouse. If association of files failed because of Windows settings, etc., open the file from File Open menu of SDP2000.

***.MEN: Frame File Type (frame definition file)**
***.EQN: Waveform File Type (equation / waveform file)**
***.DNL: Download File Type (download file)**

STEP 3 TG700 Signal Library has the following directory configuration. Select the test signal to be referenced in the order of Module → Format → Test Signal Button.

- Signal Library
- Module (module directory)
- Format (format directory)
- Test Signal Button (test signal button directory)
- .MEN Files (frame definition file)
- .CMP Files (compile signal file)
- EQN Directory (waveform file directory)
- .EQN Files (equation / waveform file)
- .INS Files (digital insertion file)
- DNL Directory (download file directory)
- .DNL Files (download file)
- DNLLIST.TXT

In the next example, DVG7 Module, 525-270 Format, and COLORBAR Button are selected. Test signals are categorized into Test Signal Button directories in a manner such as COLORBAR → COLORBAR Button directory (refer to Figure 3).

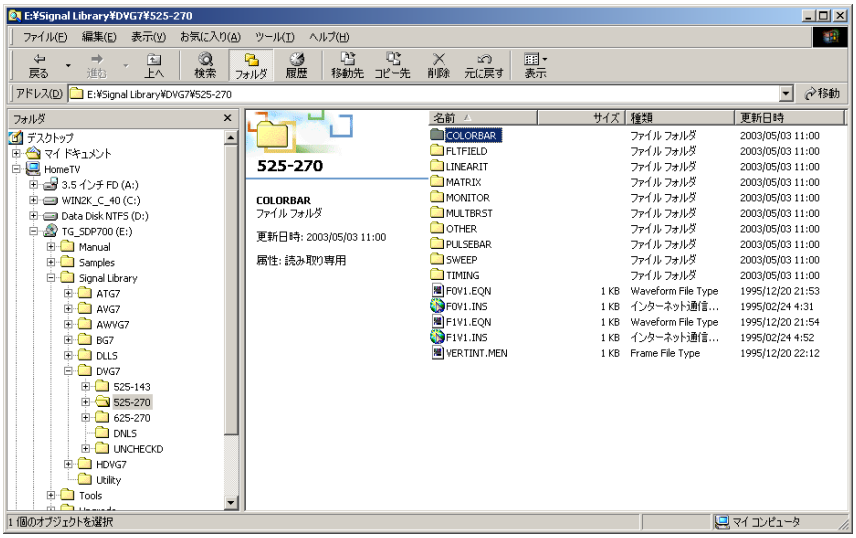

Figure 3　Selection of Test Signal Button directory

STEP 4　From Test Signal Button directory, select to open a MEN file of the test signal to be referenced (refer to Figure 4).　When the MEN file does not open even if double-clicked on it, open the MEN file from File Open menu of SDP2000.　To each of MEN files, a file name relevant to the test signal is assigned with the restriction to be less than 8 characters.　In the example shown in Figure 4, BAR100.MEN is selected.　This is the MEN file of 100% COLORBAR signal.

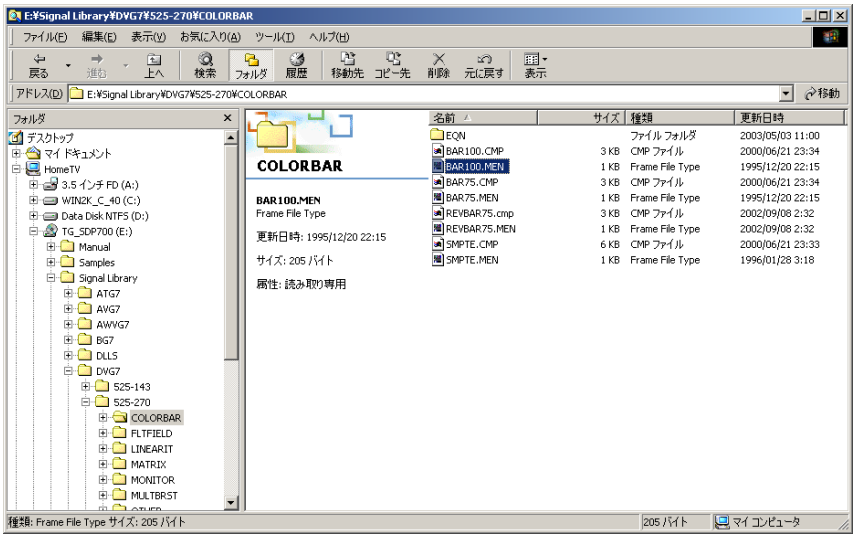

Figure 4　Selection of MEN File (BAR100.MEN)

STEP 5 Select and double-click on a MEN file with the mouse. With this, a window for the MEN file opens in Application window of SDP2000. In this representation of the frame definition file, you can verify information of the test signal's frame configuration (that is, which test signal is assigned to what range of line numbers, etc.) (refer to Figure 5).

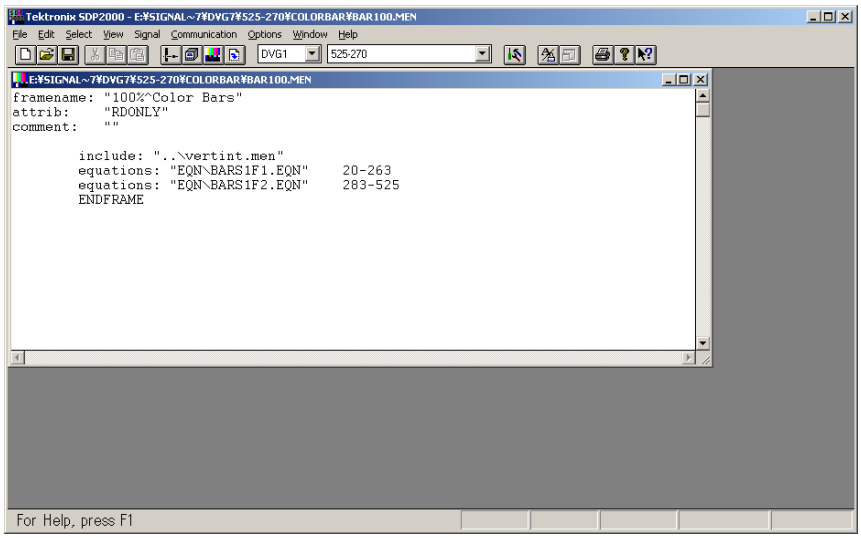

Figure 5 SDP2000 Window when Opened a MEN File

STEP 6 Press the 5th button from the right on Tool Bar located at the top of window while a MEN file is being open. With this, Graphic View window of test signal opens. To display the Graphic View in a size matched with the window size being open, use Size Adjust button (the 4th button from the right) (refer to Figure 6).

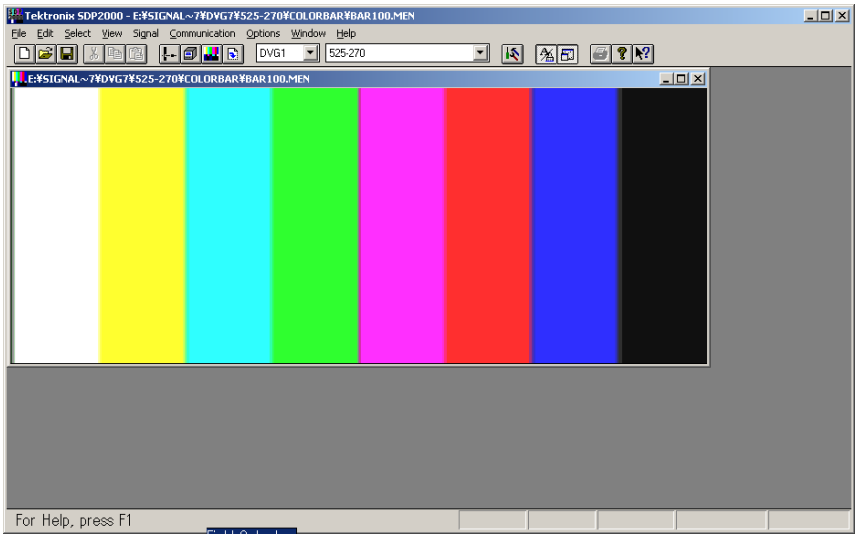

Figure 6 Graphic View Window of a MEN File

Double-clicking on XXXX.EQN area in MEN file representation opens an EQN (equation / waveform) file of that line (refer to Figure 7). The EQN file allows you to verify the test signal's waveform. By selecting any portion in the signal waveform with the mouse, the level and the sample number are indicated on the bottom right corner of SDP2000 window. In the case of test signals for multiple channels, select one of channels from Select menu. The unit of amplitude or timing can be changed from Amplitude menu or Timing menu (i.e., Option menus).

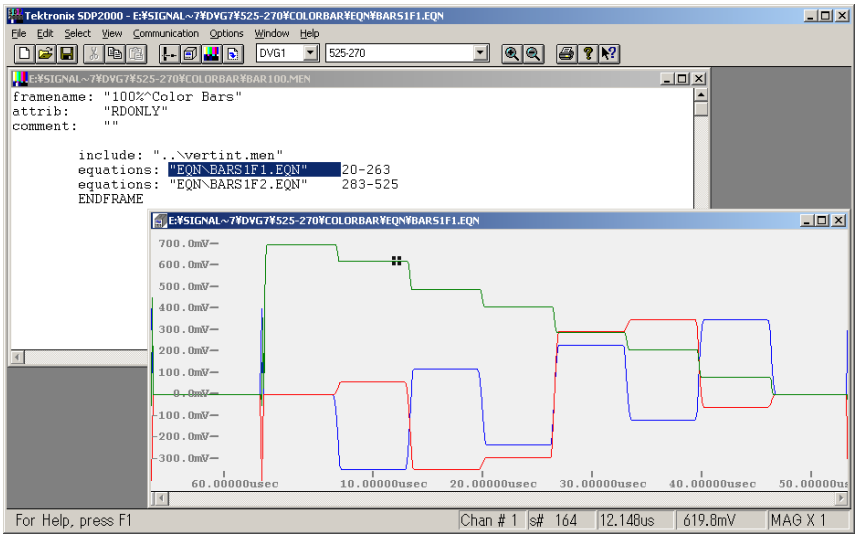

Figure 7 Window when Opened EQN File from a MEN File
(the color scheme is modified with optional settings of SDP2000.)

STEP 7 In EQN file window, double-click on the waveform portion with the mouse. With this, Edit window opens and you can verify the equation data with which the waveform is configured. By selecting one of functions located at the left on Edit window, you can verify Timing, Amplitude, Phase, Frequency, etc. of the waveform function.

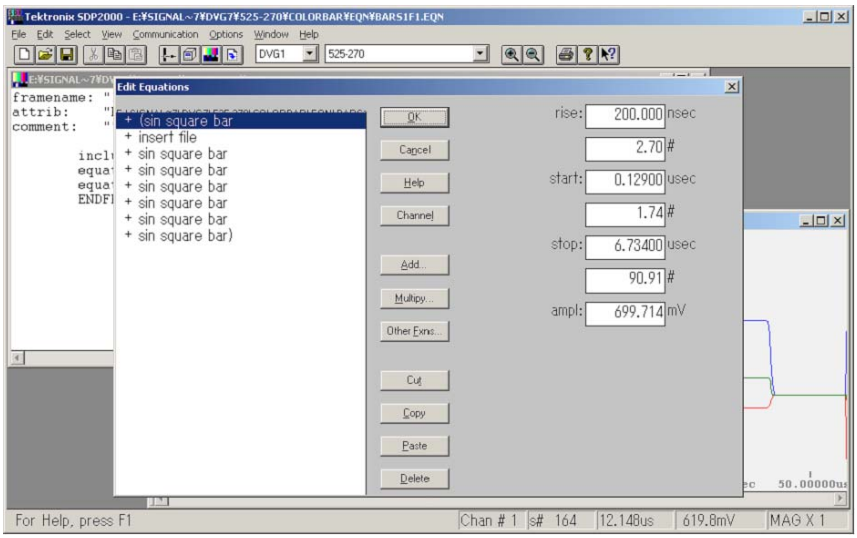

Figure 8 When opened Edit Window of EQN File

Because NTSC / NTSC_NSU / PAL composite signal available on ATG7, AVG7 and BG7 Option CB is generated as YPBPR component signal format, this test signal is displayed as a component signal waveform in SDP2000. Although the amplitude of Y signal is indicated with the correct value, the amplitude of PB / PR signals is indicated to be one half of p-p amplitude of the composite signal.

In ATG7, AVG7, AWVG7 and BG7 Option CB, the test signals are generated utilizing AVG1 format of SDP2000. Thus, when opened test signal files (MEN, EQN) of these modules, they are recognized as the signals in AVG1 format.

STEP 8 DNLS directory under each of module directories contain DNL (download) file(s). By double-clicking on a DNL file, the DNL file opens and you can verify the test signals contained in the DNL file (refer to Figure 9). The list of test signals contained in each of DNL files is also provided in text file format under DNLS directory.

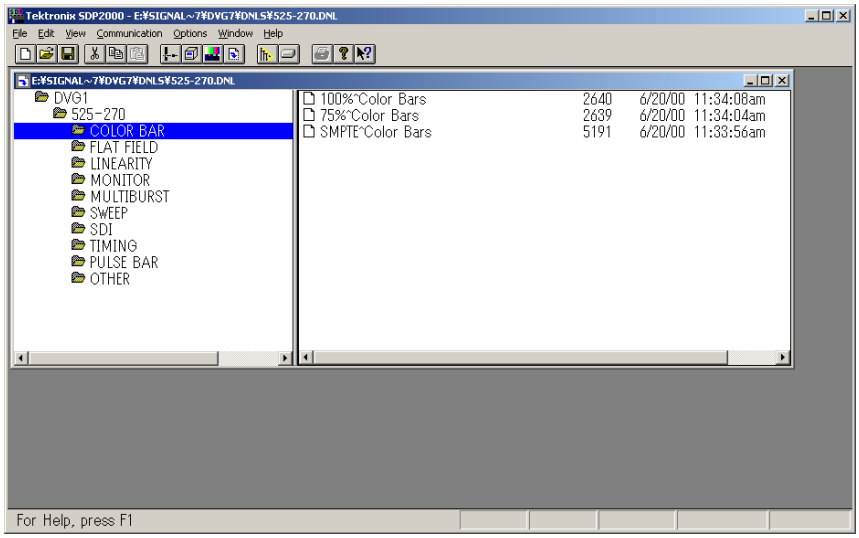

Figure 9 Window when Opened a DNL File with SDP2000

In DNL files for TG700, format name, button name and test signal name are specifically defined for TG700. Because of this, the format name, the button name, and the test signal name may differ from those of DNL files for TG2000 even if they have the same format.

DNL files of ATG7, AVG7, AWVG7 and BG7 Option CB are generated as DNL files for AVG1 first then converted into formats for various types of modules utilizing TgDNL tool. When opened DNL files for these modules in which test signals are contained, AVG1 directories which contain no test signal are displayed together with directories having the names of each module in which test signals are contained. This is normal, however. Directories having the names of each module contain the test signals to be downloaded to such module.

Reference: **Because the files on CD-ROM are not overwritten, test signal data is not damaged with the operation on SDP2000. Verification of the test signal's parameters and the contents of DNL files can be done in safety.**

Editing Procedure of Test Signal Parameters

Description below is intended for users of SDP2000 supplied as one of TG2000 accessories. For details of SDP2000, refer to SDP2000 Users Manual.

TG2000 and TG700 generate test signals utilizing SDP2000 Signal Generation Program, and many of test signals can be used in common on TG2000 and TG700. Several restrictions are imposed, however, because of differences in hardware configuration resulted from the supported functions on TG2000 and TG700. This section describes restrictions imposed to test signals of TG700, and the caution in editing the test signals of TG700. Modification of test signals on ATG7 and BG7 Option CB is not covered by Tektronix support, however.

1. Restrictions to TG700 and SPD2000

1.1. SDP2000 Environment for TG700

In SDP2000 supplied as one of TG2000 accessories, settings are tailored for TG2000 modules. In SDP2000 contained in the CD-ROM for TG700, on the other hand, settings are tailored for TG700 modules.

Environmental settings for SDP2000 mean the format definitions and the test signal library to be supported. If performed file operations for TG700 with SDP2000 for TG2000, a possibility exists that definitions of different format may be applied (depending on the version of SDP2000, the required format may not be defined).

These environmental settings are described in FORMATS.SET (default setting) and USERFMTS.SET (user setting) files under SDP2000 directory. To handle TG700 test signals with SDP2000, use FORMATS.SET and USERFMTS.SET specific to TG700.

As the test signals for TG700, use SDP2000 provided in TG700 signal library. SDP2000 for TG2000 is incompatible with the test signals of AWVG7.

SDP2000 (READER) for TG700 is executable from the CD-ROM. In performing the editing of test signal, etc., however, it is recommended to set up SDP2000 for TG700 to the PC. Set-up of SDP2000 for TG700 can be done with following procedure.

- Execute the set-up of SDP2000 (V3.1 or after).
- Delete all the directories under SDP2000 directory.
- Copy all the directories under Signal Library directory in TG700 CD-ROM.
- Overwrite DP2000.EXE, FORMATS.SET, and USERFMTS.SET files (under Signal Library directory of TG700 CD-ROM) to the directory of SDP2000.

SDP2000 signal generation program is supplied as one of standard accessories of TG2000. Because SDP2000 (READER) contained in TG700 CD-ROM is intended for the purpose to verify test signal parameters, SDP2000 Users Manual is not supplied.

1.2. Restriction to TG700 DNL Files

In TG2000, format name, test signal button name, and test signal name defined by DNL file are displayed on a large-sized LCD. In TG700, on the other hand, DNL files are provided only in the formats specified by each of modules. This is because (a) display format of LCD on the front panel is 40 characters x 2 lines, (b) test signal buttons on the front panel are fixed to 10 types, and (c) only limited formats are supported.

Because of this, it is not recommended to download DNL files for TG2000 to TG700 in as-is form. It is necessary to perform modification / addition of TG700 test signals based upon the standard DNL files of each module provided in TG700 signal library.

The signal generating function of SDP2000 is shared among ATG7, AVG7, AWVG7 and BG7 Option CB. Use the following steps to generate test signals for these modules; (a) perform compilation of test signals by SDP2000, (b) add the test signal file to TG700 DNL file of each module, and (c) perform DNL file conversion utilizing a DNL conversion tool (TgDNL.EXE).

In SDP2000, restrictions on MS-DOS file name are imposed (that is, file name up to 8 characters / 1 Byte alphanumeric character / 3 characters of extension / prescribed extension). These restrictions are also imposed to DNL file name.

1.3. Restriction to format name, test signal button name and test signal name

Although nomenclature other than format name or test signal button name used on the standard DNL file can be used, there are restrictions to usable types of characters (1 Byte alphanumeric characters only) and number of characters, however.

If it is desirable to use a nomenclature other than standard one, ensure that the number of characters contained in such nomenclature not to exceed the number of characters for format name and / or test signal button name supported as default.

- 1080 23sF YpbPr (format name: 15 characters)
- COLOR BAR No Setup (test signal button name: 18 characters)

As the test signal name, use 1 Byte alphanumeric characters only. Although symbol "^" is regarded as Line Feed in TG2000, the symbol is converted to a Space on TG700. For usable characters other than 1 Byte alphanumeric character, refer to SDP2000 Manual.

It is recommended to use characters used as the standard test signal names. Also ensure that the number of characters not to exceed the number of characters of the standard test signal names.

- 100%^Color Bars
- 100% Sweep^1-15 MHz
- 4 Level^Pedestal^& Pluge (test signal name: up to 24 characters)

Caution: If used a file name and / or a folder name where characters other than 1 Byte alphanumeric character(s) are contained, failure may occur in functions available on TG700 and recovery from the failure may be impossible in the worst case. Ensure to avoid accidental use of such characters.

2. Restriction common to TG700 Modules

2.1. Long Frame Signal

In TG2000, test signals having a long sequence extended across multiple frames utilizing CONTINUE command of SDP2000 are supported. In TG700, on the other hand, only the test signals with frames with the length defined by each module are supported. Because of this, test signals created with CONTINUE command of SDP2000 are unusable on TG700.

In TG700, sync signal portion is generated by the hardware based on the format of test signal recognized. Because of this, TG700 is compatible with the frame frequencies defined internal to TG700 only. With the adoption of this system, the features such as synchronized generation of multiple formats, Frame Picture function, Active Scroll, and High-speed Signal Switching are implemented.

2.2. Test signals with modified blanking interval and / or sync signal portion

In TG2000, modification of blanking interval and / or sync signal portion of a test signal is possible. In TG700, on the other hand, modification of these portions in a test signal is impossible. In TG700, test signals excluding their active portions are generated by the hardware. Because of this, even if downloaded a test signal with modification to those portions, such modification is not reflected to TG700 test signal.

The reason why the hardware is used for generation of these portions of test signal is to prevent the occurrence of shocks to sync signal when performed switching between test signals during operation. With this system configuration, TG700 is able to implement Active Scroll and Frame Picture functions.

Modules and formats to which insertion of VITS and / or ITS signals into the vertical blanking intervals is possible are (a) NTSC / NTSC_NSU / PAL format of ATG7, AVG7, BG7 Option CB, and (b) 525-143 / 525-270 / 625-270 formats of DVG7. Modification of sync signal is impossible, in this case. In addition, the signals inserted to the vertical blanking interval do not scroll during Active Scroll operation.

2.3. Clock Frequencies

TG2000 supports the test signals whose clock frequencies are modified within a range supported by each of modules. On the other hand, TG700 is compatible only with the clock frequencies assigned to each of modules. Because of this, it is impossible to use the test signal formats with modified clock frequencies on TG700.

In TG700, the supported clock frequencies are 14.318182 MHz, 27 MHz, 74.25 / 1.001 MHz, and 74.25 MHz. These clock frequencies are locked to a highly stabilized internal reference frequency oscillator to implement the generation of stable sync signals and test signals with less jitter.

2.4. Variable Function of TG2000

In TG2000, a function to name and save a test signal with its parameters such as amplitude, etc. are modified utilizing variable function is provided. It is also possible to save such a test signal with modified parameter(s) to a floppy disk as a DNL file.

In TG700, variable function of test signal is not available. Thus, it is impossible to use a test signal created utilizing variable function of TG2000.

2.5. Editing / Creating Composite Signals

In ATG7, AVG7, and BG7 Option CB, test signals are created by the signal conversion from analog composite format into YPBPR component format. To keep the compatibility with composite signals, 4-field sequence of signal format is defined for NTSC / NTSC_NSU and 8-field sequence of signal format is defined for PAL (for details of format definitions, refer to the following formats of SDP2000 for TG700).

- 525 / 59.94 / 2:1 YPBPR 4 Field
- 625 / 50 / 2:1 YPBPR 8 Field

Because of this, verification of composite signal waveforms is impossible while creating a test signal with SDP2000 (refer to Figure 10). Although Y signal's amplitude is correctly displayed, it is necessary to input B-Y / R-Y signals' amplitude to be one half of chroma signal's amplitude (p-p value) of the composite signal.

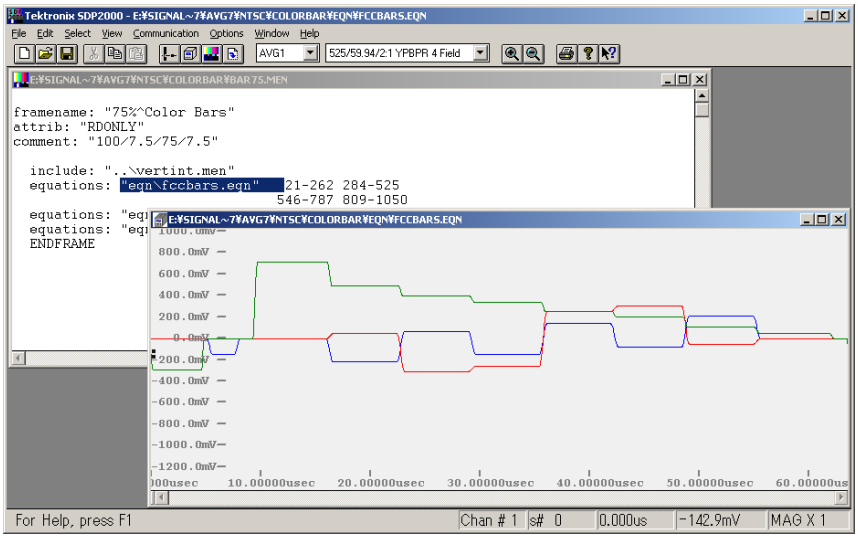

Figure 10 NTSC Test Signal Waveforms Representation in AVG7

For example, NTSC burst signal (amplitude: 285.714 mVp- p, phase: 180°) is generated as a signal having -142.857 mV of amplitude on PB channel. In the case of a signal synthesized by B-Y and R-Y signals, the signal is created with calculation of signal amplitudes on PB and Pr channels.

In ATG7, AVG7, and BG7 Option CB, major test signals are available in NTSC / NTSC_NSU / PAL formats. To perform editing / modification of test signals, refer to various types of functions, amplitude, rise time, etc. used in these test signals.

2.6. Vertical Blanking Interval

Test signals such as Colorbar, Flat Field, etc. of analog composite format support "half line". Depending on formats, appropriate number of lines is assigned to the vertical blanking interval. In NTSC_NSU format, the vertical blanking interval conforming to the Japanese standard is adopted.

3. DNL File Conversion Tool (TgDNL)

3.1. DNL File Conversion Tool

AVG1 signal generating function of SDP2000 is shared among ATG7, AVG7, AWVG7, and BG7-CB. Following steps are required to generate test signals for these modules; (a) perform compilation of the test signal by SDP2000, (b) add the test signal file to TG700 DNL file of each module, and (c) perform DNL conversion utilizing a DNL conversion tool TgDNL.

3.2. How to Use TgDNL

TgDNL (TgDNL.EXE) can be found under Utility directory in TG700 Signal Library. Use the following steps to perform DNL file conversion.

- With the start-up of TgDNL, the initial window opens (refer to Figure 11).
- Set the DNL file to be converted on the hard disk of the PC.
- From File Open menu, open the DNL file thus prepared.
- With Select Module command, select the module on which the DNL file to be used.
- With Misc Record command, select the format of DNL file.
- If the format to which the DNL file to be converted is GBR, check "√" on GBR.
- After the setting completed, press Execute button.
- Conversion of DNL file is executed. The DNL file thus converted is created with the file name before conversion (refer to Figure 12).

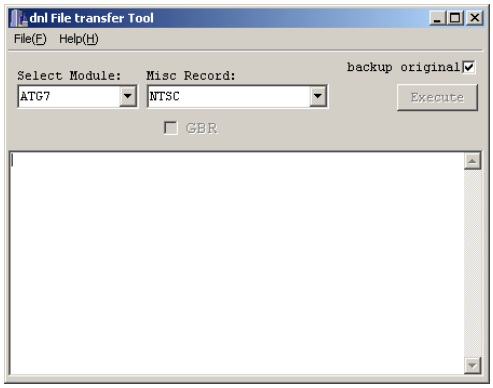

Figure 11 TgDNL Initial Window

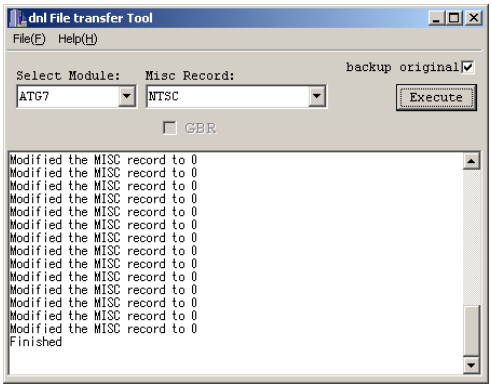

Figure 12 TgDNL Conversion Complete Window

Caution: TgDNL does not perform modification of module, format conversion, etc. TgDNL is the tool for conversion of DNL file so that the DNL file created for the target module of TG700 is usable on such a module.

Caution: The original DNL file is saved with the extension ".~NL" as default (Backup Original). If executed the conversion successively (pressing Execute button twice or more), the converted DNL file is overwritten to the original DNL file. Because of this, it is safer to back up the original DNL file with a file name different from the original one before starting file conversion procedure.

3.3. DNL File Converted by TgDNL

After performed conversion of a DNL file using TgDNL, a DNL file is created containing (a) the directory tree of the module thus converted, and (b) AVG1 directory tree with no test signal in it (refer to Figure 13).

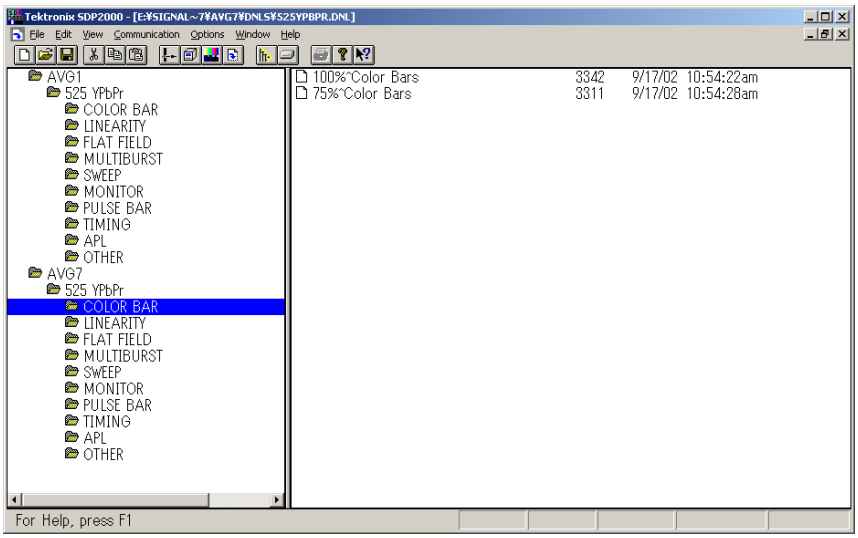

Figure 13 DNL File converted by TgDNL (for AVG7)

Addition of a new test signal to the DNL file (for AVG7) shown in Figure 13 can be done with the following steps:

- Modify / create the test signal while referencing with the test signals for AVG7 of SDP2000 with environmental settings for TG700.
- On SDP2000, compile the test signal with the format settings for AVG1.
  (Format for AVG1 module is specified in MEN file for AVG7 module.)
- With SDP2000, open DNL file for AVG7. Add and save CMP file of the test signal thus created to Test Signal button under AVG1 directory.
- After conversion of the DNL file thus saved with TgDNL again, the test signal (CMP file) added to AVG1 directory moves under AVG7 directory, and the test signal is usable on AVG7.

Caution: **It is impossible to mix a test signal file (CMP file) of different format with a test signal under Format directory of DNL file. In the download process to TG700, test signals under Format directory of DNL file are regarded as test signals of the same format. Because of this, correct output of such test signal is impossible. In addition, test signals simultaneously downloaded may be affected and such test signals may not be output correctly.**

Reference: **For details on methods of editing a test signal / compiling a file / editing a DNL file, etc., refer to SDP2000 Users Manual.**

4. Restriction to AVG7

4.1. Compatibility with TG2000 / AVG1

AVG1 and AVG7 are the test signal modules to generate analog composite signals and analog component signals. Although the test signals of AVG7 are generated utilizing the format for AVG1 of SDP2000, only the test signals with the format supported by AVG7 are compatible.

Analog component signals supported by both AVG1 and AVG7 are compatible each other but DNL file of AVG1 and DNL file of AVG7 are different. When to use a test signal generated / edited for AVG1 on AVG7, use the test signal by adding the test signal to DNL file for AVG7.

4.2. Generation of Composite Signal

In AVG7, test signals are generated by signal conversion from analog composite format to YPBPR component format (refer to section 2.5 Editing / Creating Composite Signals). Because of this, the test signals of AVG1 in NTSC / PAL formats are unusable on AVG7.

AVG7 is compatible only with analog composite signals in NTSC / NTSC_NSU / PAL format. AVG7 is incompatible with analog composite signal format such as PAL-M / PAL-N / SECAM, etc. supported by AVG1.

4.3. Restriction to Number of Test Signals

In AVG7, restriction is imposed to the number of test signals downloadable at a time. Because of the difference in the number of lines constituting the test signals, this restriction depends on the format (refer to Table 1).

Format	Number of Test Signals
NTSC	64
PAL	32
525 Component	128
625 Component	128

Table 1 Restriction to Number of Test Signals

Not to exceed the restriction above in selecting a format and downloading a test signal to the module, PAL format of AVG7 is divided into PAL and Pal-2. Because much more types of test signals are available in NTSC format and 525 / 625 analog component format, these formats can be used with less consciousness to the restriction.

In the test signal to be downloaded, two types of test signals dedicated to implementation of APL function and a test signal for calibration are necessarily included. These test signals are provided under APL Button directory of the DNL file.

Caution: The number of test signals included under APL Button directory is excluded from the number of test signals actually available.

4.4. Restriction to DNL File

DNL files for AVG7 consist of (a) test signal files, (b) signal file for APL function, and (c) calibration signal file (refer to Figure 14).

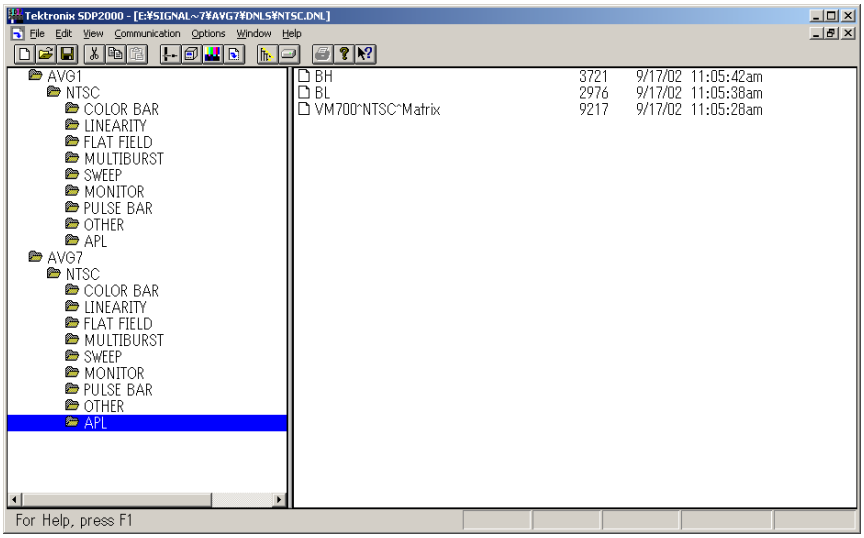

Figure 14 NTSC DNL File for AVG7

Test signal files are provided under Test Signal Button directory that correspond with test signal buttons on the front panel, and modification / addition to them are possible. Test signals under APL Button directory are provided for the purposes of APL function and calibration, and no modification is possible.

Modification / addition of test signals under directories of Test Signal Buttons COLOR BAR, LINEARITY, FLAT FIELD, MULTIBURST, SWEEP, MONITOR, PULSE BAR, and OTHER are possible within a range not exceeding the number of test signals defined by the format. Addition of a test signal to an existing Button directory can be achieved by following steps: (a) perform editing to the DNL file as necessary, (b) convert the DNL file thus edited into DNL file for AVG7 utilizing TgDNL tool, (c) download the converted DNL file to TG700, (d) re-start TG700. With this, the newly added test signal is usable on TG700.

Addition of a test signal is also possible by creating a Test Signal Button directory not included in the standard DNL file then adding a test signal to such button. Two methods are available in this case. The one is to assign the added Test Signal Button directory to TIMING button (not used in NTSC / NTSC_NSU / PAL) on the front panel and to Test Signal button of SDI. The other is to modify the standard key assignment of Test Signal button. Addition of a new test signal with this method is achieved by following steps; (a) download the DNL file to TG700, and (b) modify key assignment of the test signal (refer to TG700 Users Manual).

Caution: If performed modification to any portion unable to modify, normal operation is not guaranteed. Good understanding of the restrictions is mandatory. The modification shall be performed taking the restrictions imposed to format name, test signal button name, and test signal name usable in TG700 into consideration (refer to section 1.3).

Standard PAL and PAL-2 DNL files contain various types of test signals to the possible upper limit. Because of this, it is necessary to replace the new test signal(s) with the existing test signal(s) when to perform any modification to test signals of PAL / PAL-2 format.

It is also possible to create a DNL file by converting a test signal of PAL format into a test signal of PAL-3 format. In this case, DNL file is configured so that the test signal for APL function is included in the DNL file. When added a test signal with a new format name, it is necessary to perform key assignment on the front panel to all the test signal buttons.

The reason why test signals overlap in PAL and PAL-2 formats is that DNL files are created so that frequent switching between formats is unnecessary. In PAL format, test signals almost similar to those of TSG271 are available. In PAL-2 format, on the other hand, test signals appropriate for measurements to be performed utilizing VM700T are available.

4.5. Restriction to Signal Generating Circuit

In AVG7, a circuit that generates 12-bit test signals is adopted. Thus, 12-bit amplitude representation of SDP2000 coincides with the test signal's amplitude in the standard format definitions of TG700.

Relationship between 12-bit data of AVG7 and the actual output signal amplitude is as shown below. This setting does not change even if changed the format definitions of SDP2000 (refer to Figure 15).

- 1V = 2520 LSB
- 1 LSB = 0.396825396825397 mV

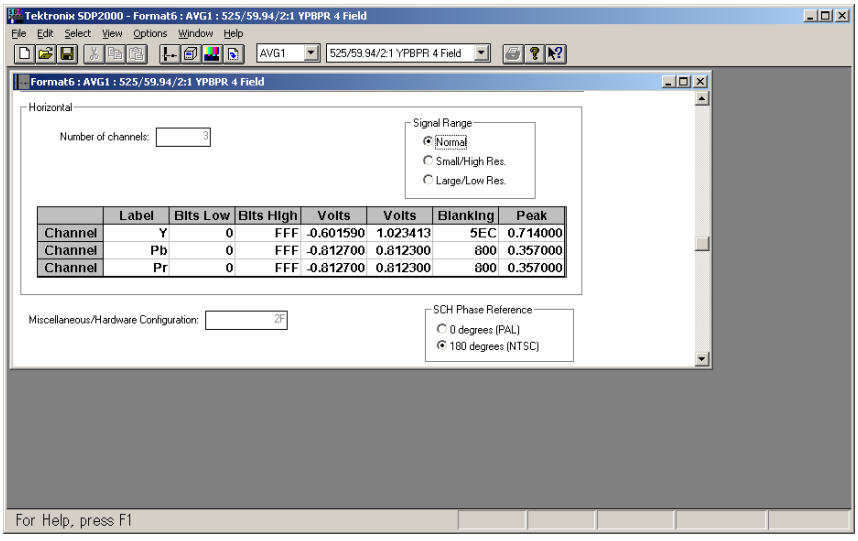

Figure 15 SDP2000 Format Setting

Reference: Actual test signal output of AVG7 is affected with the characteristics of analog output circuit (for detailed characteristics of the output signal, refer to the specification of AVG7).

5. Restriction to AWVG7

5.1. Compatibility with TG2000 / AWVG1

AWVG1 is the 1-channel wide-band analog video generator containing a Zone Plate signal generator circuit. AWVG7, on the other hand, is the 3-channel wide-band analog component test signal module generating HDTV analog component signals. There is no compatibility between AWVG1 and AWVG7.

In AWVG7, 3-channel component signal generation system of SDP2000 for AVG1 is adopted. AVG1 and AVG7, on the other hand, are incompatible with HDTV system clock frequency of 74.25MHz or 74.25 / 1.001MHz. Thus, there is no compatibility with these modules.

With SDP2000 supplied as one of standard accessories to TG2000, it is impossible to use clock frequencies exceeding 36MHz with the format for AVG1. In SDP2000 supplied in the CD-ROM for TG700, this restriction is modified so that it is compatible with the generation of test signals for AWVG7.

In generating HDTV analog signals, AWVG1 and AWVG7 use clock frequencies of 74.25MHz and 74.25 / 1.001MHz. Although the test signals of the opposite module can be used through mutual reference while utilizing SDP2000, Zone Plate signal and Sweep signal (they are generated utilizing Zone Plate generator circuit of AWVG1) are unusable on AWVG7.

5.2. Generation of Test Signals other than HDTV

AWVG7 is compatible with HDTV format of 1125 (1080) / 750 (720) lines only. It is impossible to generate SDTV format of NTSC / PAL analog composite signals or 525 / 625 analog component signals.

5.3. HD-SDI Test Signal and HD Analog Test Signal

Test signals of AWVG7 use the parameters of amplitude, timing, rise time, etc. common to HD-SDI signals and test signals generated by HDVG1 and HDVG7.

5.4. Restriction to Downloadable Format

AWVG7 is compatible with 36 formats of HDTV analog component test signals. Because TG700 is equipped with only 16MB of flash memories as its standard specification, it is impossible to download the test signals of all the formats above at a time.

If you want to use the test signals of HDTV format supported by AWVG7 by switching between them, use TG700 Option FP or delete the unused test signals from those pre-installed to TG700 then to add the necessary test signals.

Caution: If deleted some of test signals pre-installed to TG700, it is necessary to re-start TG700. For test signals of newly added format, it is necessary to perform key assignment on the front panel. Re-downloading DNL files contained in the CD-ROM supplied as one of standard accessories of TG700 allows re-installation of the test signals once deleted.

5.5. Restriction to DNL File

DNL file of AWVG7 consists of the test signal files and the calibration signal files (refer to Figure 16).

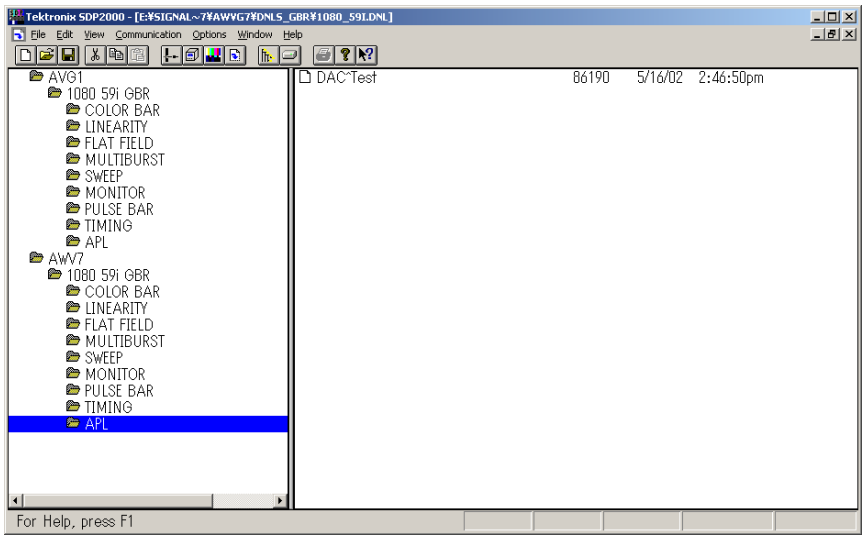

Figure 16 1080 59i.DNL File (GBR) of AWVG7

Test signal files are located under Test Signal Button directory that correspond with each of Test Signal buttons on the front panel. Modification / addition of test signal files are possible. Test signals under APL Button directory are provided for calibration purpose, and their modification is impossible.

Modification / addition are possible to test signals located under following Test Button directories:

COLOR BAR, LINEARITY, FLAT FIELD, MULTIBURST, SWEEP, MONITOR, PULSE BAR, SDI, TIMING, and OTHER

To add a new test signal to an existing Test Button directory, use following steps; (a) perform the editing to a DNL file, (b) convert the DNL file thus edited into DNL file for AWVG7 utilizing TgDNL tool, (c) download the DNL file to TG700, and (d) re-start TG700. With this, the new test signal is usable.

Addition of a new test signal is also possible with steps other than above; that is, (a) create a Test Signal Button directory not included in the standard DNL file, and (b) add a new test signal to such a Test Button directory. To use the newly added test signal, in this case, assign the newly created Test Signal Button directory to a key of Test Signal Button on the front panel. When added a test signal in this way, it is necessary to modify the test signal key assignment on the front panel after downloaded the DNL file to TG700 (refer to TG700 Users Manual).

Caution: If performed modification to any area impossible to modify, the modified function will be disabled. Ensure to perform modification with good understanding to the range of restriction.

Caution: Only 1 Byte alphanumeric characters can be used as test signal name / test button name within the restriction. Consideration also shall be given to restrictions imposed to format name, test signal button name, and test signal name usable on TG700 (refer to section 1.3).

5.6. Restriction to Signal Generator Circuit

In AWVG7, a 12-bit test signal generator circuit is adopted. Thus, 12-bit amplitude representation in SDP2000 coincides with the test signal's amplitude in the standard format definition for TG700.

Relationship between 12-bit data of AWVG7 and the output signal's amplitude is as shown below. This setting does not change even if changed the format setting of SDP2000 (refer to Figure 17).

- 1V = 2520 LSB
- 1 LSB = 0.396825396825397 mV

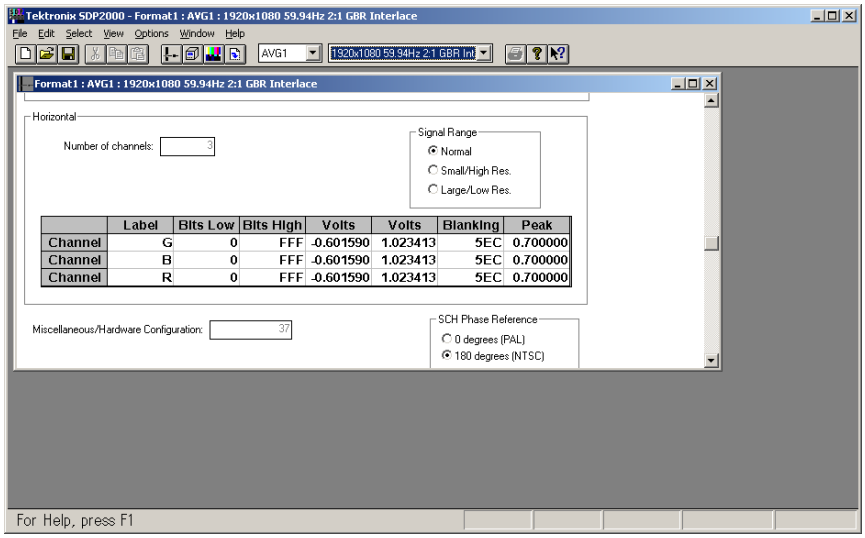

Figure 17 Format Settings of SDP2000

Reference: **Actual test signal output of AWVG7 is affected with the characteristics of analog output circuit (for detailed characteristics of output signal, refer to the specification of AWVG7).**

5.7. Test Signal's Parameters (reference information)

In AWVG7, test signals are provided conforming to SMPTE 274M standard. However, H blanking interval and the signal timing are consistent with that of HD-SDI test signals in HDVG1 and HDVG7 excluding 100% Flat Field signal.

The reason why is to keep the signals obtained by digital / analog conversion of HD-SDI signals to be consistent with the test signals generated by AWVG7.

100% Flat Field signal of AWVG7 has its maximum width allowed in the standard so that the signal can be used for the measurement of blanking interval.

6. Restriction to DVG7

6.1. Compatibility with TG2000 / DVG1

Both DVG1 and DVG7 modules generate SDI (Serial Digital Interface) test signals for SDTV. In DVG7, test signals are generated utilizing the format for DVG1 of SDP2000. Because of restrictions common to the modules for TG700, however, the compatibility is incomplete.

DVG7 is incompatible with SDI signals of 360Mb/s. Thus, DVG7 is unable to generate test signals in 525-360 / 625-360 format of DVG1. Because SDP2000 of V3.0 or before has different definitions on 525-270 format, test signals of DVG1 compiled with SDP2000 of V3.0 or before are required to be re-compiled with SDP2000 of V3.1 and after, or under SDP2000 environment of SDP2000 provided in the CD-ROM of TG700.

In DVG1, modification to horizontal / vertical sync signal areas or blanking intervals is possible. However, DVG7 is incompatible with test signals modified in these areas / intervals because the signals other than active areas are generated by the hardware. Avoid DVG1 test signals modified in horizontal / vertical Sync areas or in blanking intervals from being used on DVG7.

DNL files of DVG1 are different from DNL files of DVG7. To use a test signal edited / created for DVG1 on DVG7, add such a test signal to DNL file for DVG7.

6.2. Editing DNL Files

DNL file of DVG7 consists of Test Signal Button directories that correspond with each of Test Signal buttons on the front panel and Test Signal files located under such directories (refer to Figure 18).

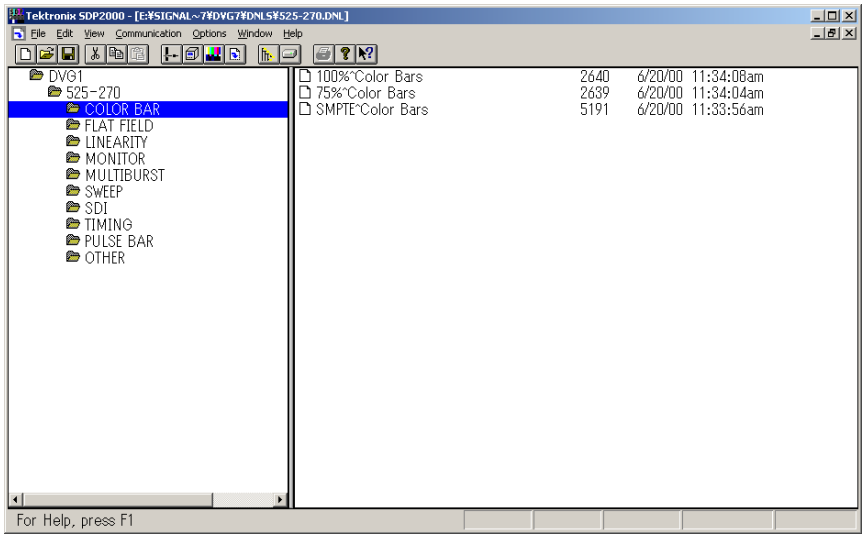

Figure 18 525-270.DNL files of DVG7

Modification / addition of a test signal under following Test Signal Button directories are possible:

COLOR BAR, LINEARITY, FLAT FIELD, MULTIBURST, SWEEP, MONITOR,
PULSE BAR, SDI, TIMING, and OTHER

To add a new test signal to an existing Test Signal button, perform the editing of DNL file first then download the DNL file thus edited to TG700. After re-starting TG700, the newly added test signal is usable.

Addition of a new test signal is also possible with the following steps; that is, (a) create a Test Signal Button directory not included in the standard DNL file, and (b) add a new test signal to such Test Signal Button directory. To use the newly added test signal, it is necessary to assign the newly created Test Signal Button directory to a Test Signal Button key on the front panel. To add a new test signal with this method, it is necessary to modify the key assignment of Test Signal on the front panel after downloaded DNL file to TG700 (refer to TG700 Users Manual).

Caution: Editing / creation of test signals for DVG7 shall be performed based on the standard test signals for DVG7.

Caution: To add an existing test signal of DVG1 to the DNL file of DVG7, be careful to the version of SDP2000 in compile process of the test signal. It is recommended to re-compile the test signal under the environment of SDP2000 provided in the CD-ROM of TG700.

Caution: As test signal name and test signal button name, only 1 Byte alphanumeric characters can be used in a range not exceeding the restriction. Consideration also shall be given to the restriction on format name and test signal name usable on TG700 (refer to section 1.3).

6.3. Optional Blanking (reference information)

In DVG7, insertion of a test signal to lines 10 ~ 19 as well as 273 ~ 282 is possible because some amount of room is left to cope with Optional Blanking currently not officially supported.

Because of this, it is possible to insert a test signal to the active portion of lines in the vertical blanking interval said above. When used Active Scroll function, the test signal inserted to this portion is excluded from the scroll area.

6.4. Using DNL file of DVG7 on DVG1

DNL file of DVG7 is created for use on DGV7, and Test Signal Button directory name, Test Signal name, etc. are different from that of DNL file for DVG1. However, the DNL file of DVG7 can be used as it is on DVG1.

6.5. 525 - 270 16 x 9 / 625 - 270 16 x 9 Formats

Under UNCHECKD directory of DVG7 signal library, DNL files of 525-270 16x9 / 625-270 16x9 format are provided. However, the signal library of these formats is not supplied as one of standard accessories.

When used DNL files of 525-16x9 / 625-16x9 formats, a circle overlaid is displayed as a true circular pattern on a picture monitor with aspect ratio of 16:9. The ratio of Convergence signal is also modified so that it matches with aspect ratio of 16:9.

7. Restriction to HDVG7

7.1. Compatibility with TG2000 / HDVG1

Both HDVG1 and HDVG7 modules generate SDI (Serial Digital Interface) test signals of HDTV format. Test signals of HDVG7 are generated utilizing the format for HDVG1 of SDP2000. Because of the restriction common to modules for TG700, however, some of test signals are incompatible.

In HDVG1, it is possible to apply modification to horizontal / vertical Sync areas and / or blanking intervals of the test signal. HDVG7 is incompatible with the test signal modified in these areas / intervals because the signals other than active areas are generated by the hardware. Avoid HDVG1 test signals modified in horizontal / vertical Sync areas or in blanking intervals from being used on HDVG7.

DNL files of HDVG1 are different from DNL files of HDVG7. To use a test signal edited / created for HDVG1 on HDVG7, add such a test signal to DNL file for HDVG7.

7.2. Editing DNL File

DNL file of HDVG7 consists of Test Signal Button directories that correspond with each of Test Signal buttons on the front panel and Test Signal files located under such directories (refer to Figure 19).

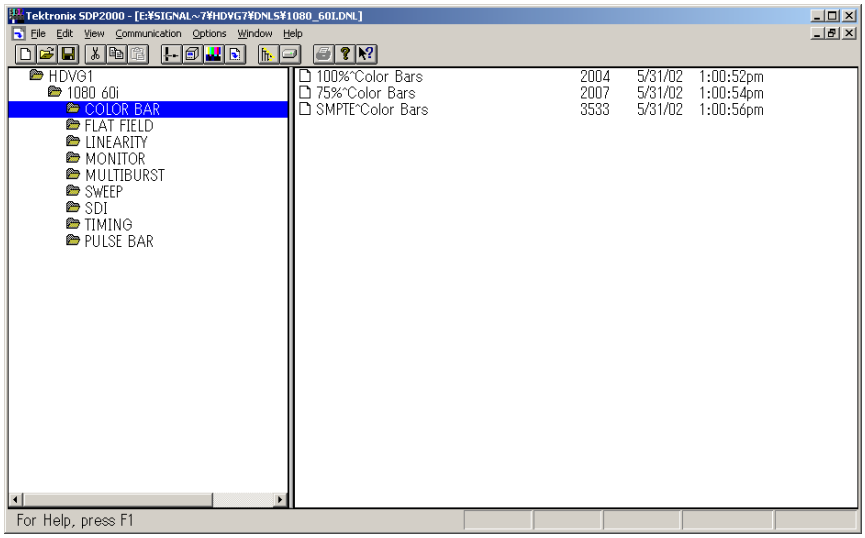

Figure 19 1080 60i.DNL file of HDVG7

Modification / addition of a test signal under following Test Signal Button directories are possible:

COLOR BAR, LINEARITY, FLAT FIELD, MULTIBURST, SWEEP, MONITOR, PULSE BAR, SDI, and TIMING

To add a new test signal to an existing Button directory, perform the editing of DNL file first then download the DNL file thus edited to TG700. After re-starting TG700, the newly added test signal is usable.

Addition of a new test signal is also possible with the following steps; that is, (a) create a Test Signal Button directory not included in the standard DNL file, and (b) add a new test signal to such Test Signal Button directory. To use the newly added test signal, it is necessary to assign the newly created Test Signal Button directory to a Test Signal Button key on the front panel.

In the standard test signals of HDVG1, there is no one to be key-assigned to OTHER Test Signal button. It is also possible to key-assign a newly created Test Signal Button directory to OTHER Test Signal button.

To add a new test signal with this method, it is necessary to modify the key assignment of Test Signal on the front panel after downloaded DNL file to TG700 (refer to TG700 Users Manual).

Caution: Editing / creation of a test signal for HVG7 shall be performed based on the standard test signals for HDVG7.

Caution: As test signal name and test signal button name, only 1 Byte alphanumeric characters can be used in a range not exceeding the restriction. Consideration also shall be given to the restriction to format name and test signal name usable on TG700 (refer to section 1.3).

7.3. Restriction to Test Signals other than 720p 59.94 / 60Hz

Although HDVG7 (V3.3 and after) is compatible with frame frequencies other than 720p 59.94 / 60Hz, SDP2000 is not compatible with test signals of such formats. Signal library of these formats is not supplied as the standard accessory.

DNL files of frame frequencies other than 720p 59.94 / 60Hz are created with a special DNL file conversion tool. Thus, users are unable to edit such DNL files.

Caution: In HDVG7, test signals with frame frequencies of 720p 25 / 29.97 / 30Hz are provided as UNCHECKED test signals. These test signals are not covered by Tektronix support.

Support to TG700 Test Signals

If you have any questions on "how to use TG700 signal library" or on TG700 test signals, please call Customer Call Center of Tektronix Japan.

For any questions on test signals of ATG7 and BG7 Option CB (modification of / addition to these signals by users are not covered by Tektronix support) or test signals of HDVG7 with frame frequencies other than 720p 59.94 / 60Hz, please call Customer Call Center of Tektronix Japan.