Chapter 2 Introduction to UTG2000A Series Function / Arbitrary Waveform Generator

UTG2000A Series Function/Arbitrary Waveform Generator adopts DDS technique into its design and is capable of generating accurate and stable waveforms with the resolution down to 1μHz. It is a type of function/arbitrary waveform generator with high performance-price ratio and multiple functions integrated just into one instrument. The output is accurate, stable and pure with minimum distortion. The squarewave offered is high in frequency and has a very fast rising and falling edges. Superb technical specifications, easy-to-use operating panel and humanized graphic display are all perfectly combined into UTG2000A model, making it possible to get your work done faster and more efficiently, and it is a versatile solution for your needs at present and in the future.

Key Features

- 60MHz (or 25MHz) sinewave output, down to 1μHz resolution for full frequency range.
- 25MHz (or 5MHz) pulse waveform with adjustable rise &fall time and duty cycle
- 250MSa/s (or 125Msa/s) sample rate and 14-bit vertical resolution
- 6-digit high precision frequency meter that compatible with TTL level signal
- Standard dual channels with independent output mo
- 1M (or 8K) arbitrary waveform memory and 48 waveforms non-volatile storage.
- Multiple modulation types: AM, FM, PM, ASK, FSK, PSK, PWM.
- Powerful software available to use in PC.
- 4.3inch high-resolution TFT color display

- Standard interfaces: USB Host, USB Device, optional LAN
- Dual channels can be applied with at the same time or independently: internal/external modulation, internal/external/manual trigger
- Support frequency sweep and burst output
- Ease-of-use multipurpose knob and numeric keypad

Notes: UTG2025A is not equipped with LAN port.

Panels and Keypad

Front Panel

UTG2000A Series Function/Arbitray Waveform Generator offers a clear and intuitive front panel design to simplify users operations, See Figure 2-1 for details:

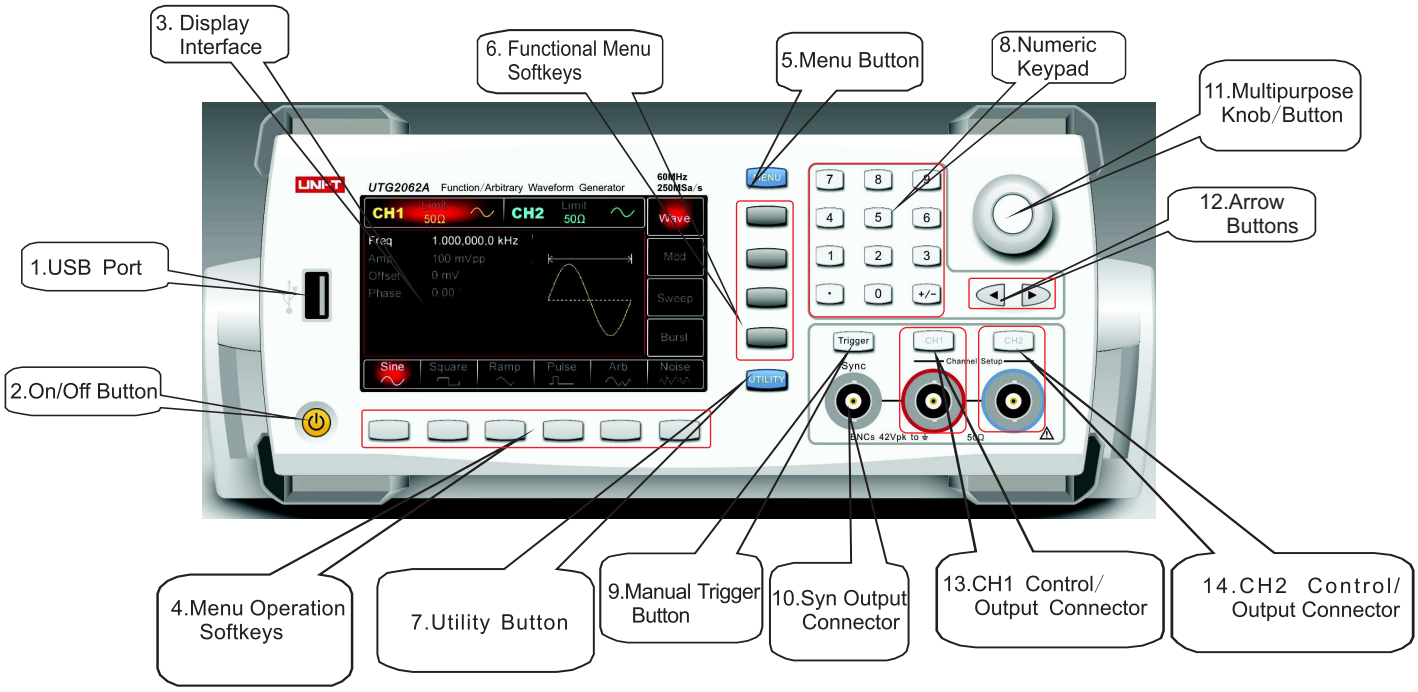
3. Display Interface
6. Functional Menu Softkeys
5.Menu Button
8.Numeric Keypad
11.Multipurpose Knob/Button
12.Arrow Buttons
1.USB Port
2.On/Off Button
4.Menu Operation Softkeys
7.Utility Button
9.Manual Trigger Button
10.Syn Output Connector
13.CH1 Control/ Output Connector
14.CH2 Control/ Output Connector
UTG2062A Function/Arbitrary Waveform Generator
CH1
CH2
Wave
Mod
Sweep
Burst
Sine
Square
Ramp
Pulse
Arb
Noise
MENU
UTILITY
Trigger
Sync
Channel Setup

Figure 2-1

1. USB Port

The Generator supports U flash drive in FAT16 and FAT32 format. Through this USB port, the Generator can read any saved waveforms from USB flash drive or store current data into the flash drive.

2. On/Off Button

To power on /off the Generator.Press down, the button is illuminated (orange) and the Generator accesses power-on interface and then functional display. To avoid any shut-down caused by accidental pushing on the button, it is designed to be pressed down and held for 500ms so as to power off the Generator. The button backlight and display will turn off simultaneously after power-down.

Note: On/Off button can be effective only after the Generator has been energized normally and its master power swith on the rear panel is set to “I” status. To disconnect AC power supply from the generator, you need to set the mster pwer switch to “O” or unplug the power cord.

3. Display Interface

The Generator offers 4.3-inch high-resolution TFT color display and distinguishes output status, menus and other important informations between CH1 and CH2 using different colors, which make human-machine interaction much easier and gets your work done efficiently.

4. Menu Operation Softkeys

To select or check the option that corresponds to every softkey (at the bottom of display screen). They can work with numeric keypad or multipurpose knob or arrow buttons to set up a parameter.

5. Menu Button

Press it and four functional labels pop out: Wave, Mod, Sweep and Burst. To select one of these

functions, press functional menu softkey corresponding to every label.

6. Functional Menu Softkeys

To select function labels that correspond to the softkeys (on the right of display screen).

7. Utility Button

Pressing the button can access four function labels: CH1Setting, CH2Setting, I/O (or Freq Meter) and System, the highlighted label (central background in grey and characters in pure white) is followed by sub-labels on the bottom of display screen . These sub-labels can help you know more what the highlighted label is related to. Pressing the bottom softkeys that correspond to sub-labels can enter into specific setup or information, for instance: to set up channels (eg: set output impedance within 1Ω --10 kΩ or to high impedance), to specify voltage limit or configure syn output, language, power-on parameters, backlight, DHCP (dynamic host configuration protocol) compatible interface, storage or recall, system information, help topic lists, etc.

8. Numeric Keypad

To enter parameter value using 0~9, decimal point ".", and "+/-" buttons. The decimal point "." can be used to switch quickly between units. Arrow buttons can backspace and clear the digit prior to current input.

9. Manual Trigger Button

To set up trigger. Manual trigger is enabled when the button backlight flashes.

10. Syn Output Connector

To output synchronous signals for all standard functions (except DC and noise) in a normal manner.

11. Multipurpose Knob/Button

To modify a number (clockwise increase) or used as arrow buttons. Pressing the knob can select functions or confirm the parameter that has been set.

12. Arrow Buttons

To scroll or clear the digit prior to the current input or move the cursor (to the right or left) when working with the multifunction knob to set up parameters.

13.CH1Control/Output Connector

To quickly change the current channel displayed on the screen (When CH1 label is highlighted, CH1 is choosen currently and all displayed parameters are CH1-related and ready to be set up). If the current channel is CH1 (highlighted CH1 label), then you can press CH1 button to turn on/off CH1 output, or press Utility to pop up CH1 Setting label and use the softkey to set CH1 settings. Under this status, CH1 button is illuminated, current output mode shows to the right of CH1 label (“wave”, or “Mod”, or “Sweep”, or “Burst” icon) and CH1 connector output is enabled. With CH1 button switched off, the button backlight turns off, “Off” icon shows to the right of CH1 label and CH1 connector is disabled.

14.CH2 Control/Output Connector

To quickly change the current channel displayed on the screen (When CH2 label is highlighted, CH1 is choosen currently and all displayed parameters are CH2-related and ready to be set up). If the current channel is CH2 (highlighted CH2 label), then you can press CH2 button to turn on/off CH2 output, or press Utility to pop up CH2 Setting label and use the softkey to set CH2 settings. Under this status, CH2 button is illuminated, current output mode shows to the right of CH2 label (“wave”, or or “Mod”, or “Sweep”, or “Burst” icon) and CH2 connector ouput is enabled. With CH2 button switched off, the

button backlight turns off, “Off” icon shows to the right of CH2 label and CH2 connector is disabled.

Rear Panel

Check details for rear panel in following Figure 2-2

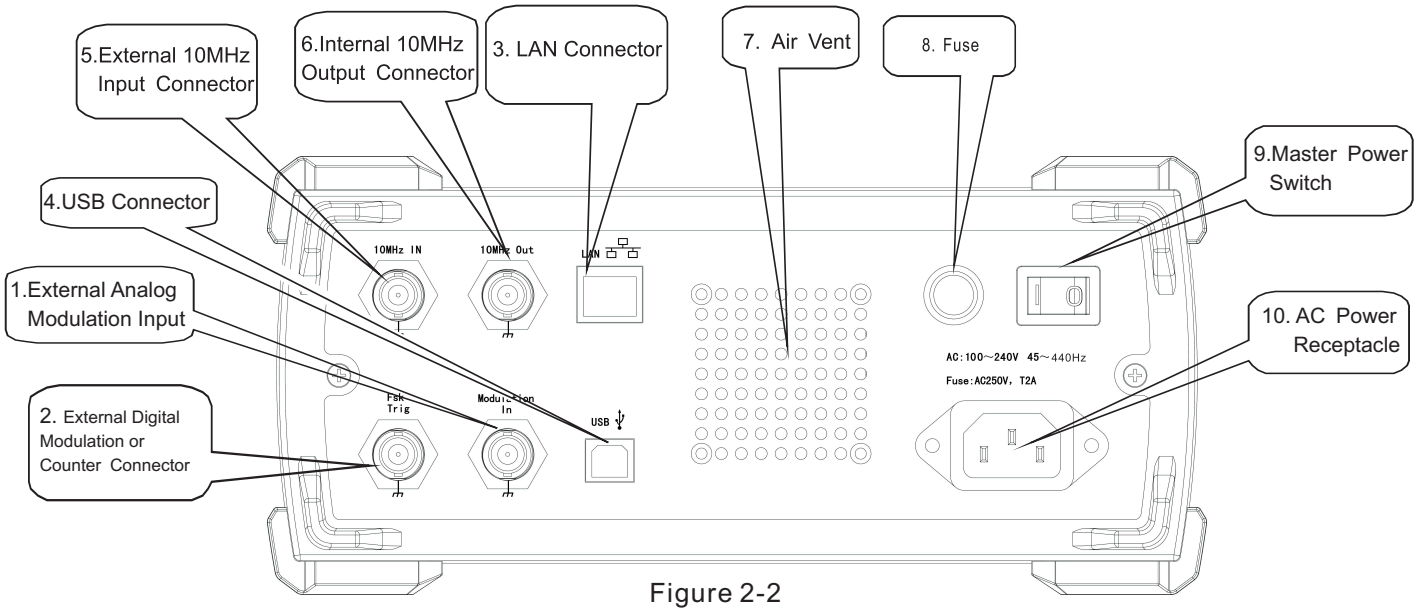

Figure 2-2

1. External Analog Modulation Input Connector

For AM, FM, PM or PWM modulation type, the terminal is used for the signal input when external source is selected. The modulation depth or deviation value (frequency, phase or duty cycle) will be controlled by ±5V signal level present on this input terminal.

2. External Digital Modulation or Counter Connector

For ASK, FSK or PSK modulation type, this connector is used for signal input when external source is selected. Output amplitude, frequency and phase will be controlled by signal level present on this connector. For Sweep or Burst mode, when you select external source, it is used to accept polarized TTL pulse that can enable the sweep or N-cycle burst. Or if the burst is gated, you can input gated signal using this connector. When use the frequency meter function, you can also use the connector to input signal (compatible with TTL level signal) or output trigger signal when under Sweep or Burst mode.(When external trigger source is selected, Trigger Out option in the parameter list will be ignored, since this connector cannot be used for input and output terminals at the same time)

3. LAN Connector

To Connect the Generator to local network for remote control.

4. USB Connector

To Connect the Generator to PC using USB cable. You can control your Generator through PC (for instance, it can be used to upgrade the Generator system program so as to ensure your function/ arbitrary generator has the latest program released by the company).

5. External 10MHz Input Connector

To input external 10MHz reference signal after the Generator clock source is set up externally.

When you want to synchronize multiple UTG2000A function/arbitrary waveform generators or synchronize the Generator and external 10 MHz reference signal, use this external input connector.

6. Internal 10MHz Output Connector

To output 10 MHz reference signal after the Generator clock source is set up internally. When you want to synchronize multiple UTG2000A function /arbitrary waveform generators or output 10 MHz reference frequency signal, use this internal output connector.

7. Air Vent

To ensure the Generator has good ventilation. Do not block these holes.

8. Fuse

To avoid disastrous damage to the Generator when the power current is extremely large due to thunderstroke or component aging. The fuse will melt down to disrupt the power supply when the input AC current exceeds 2A.

9. Master Power Switch

To energize the Generator when set to “I”; otherwise set to “O” to dis-energize AC input (On/Off button on the front panel will not work).

10. AC Power Receptacle

AC power specification for the Generator: 100~240V, 45~440Hz, power fuse: 250V, T2 A.

Display Interface

Refer to display interface shown in Figure 2-3

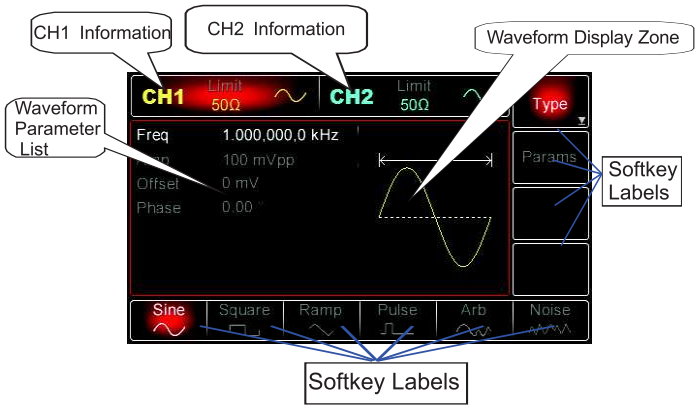

Figure 2-3

Detail Description:

■ **CH1 Information:** When the display is highlighted (central label in red), it indicates only CH1 information is enabled and CH1 parameters are ready to set up. No CH1 setup is allowed if CH1 information is not highlighted. To switch on CH1 information directly, press CH1 button. On the upper display of CH1 information, there is “Limit” icon that represents the output amplitude limit which is effective in white and off in grey. On the lower display is the impedance value that the output terminal needs to match (adjustable within 1Ω~10 kΩ, or set to high impedance that is 50Ω by default). To the right is the display of currently effective waveform (waveform shape, or “Mod” , “Sweep” or “Burst” icon) or “Off” in grey(CH1 output connector has switched off).

■ **CH2 Information:** When the display is highlighted (central label in blue), it indicates only CH2 information is enabled and CH2 parameters are ready to set up. No CH2 setup is allowed if Ch2 information is not highlighted. To switch on CH2 information directly, press CH2 button. On the upper display of CH2 information, there is “Limit” icon that represents the output amplitude limit which is effective in white and off in grey. On the lower display is the impedance value that the output terminal needs to match (adjustable within 1Ω~10 kΩ, or set to high impedance that is 50Ω by default). To the right is the display of currently effective waveform(waveform shape, or “Mod” , “Sweep” or “Burst” icon) or “Off” in grey(CH2 output connector has switched off).

■ **Softkey Labels:** To indicate the current functions which correspond to the functional menus and menu operation softkeys on the side and bottom of display. Highlighted: The display will be in the color corresponding to that of the current channel or in system grey on the center and the characters are in pure white.

1) **Labels on the Right of Screen:** The label has been selected if it is highlighted, and then 6 softkey labels on the bottom of screen will display options related to the label.(**Note:** if the currently selected label has more than one sub-catalogs, displayed options on the bottom of screen are not necessarily the sub-catalogs of the label. For instance, if Type softkey label is highlighted, on the bottom of screen will be sub-labels for types of waveforms, which are the sub-catalog of Type. If you press Menu button now, Wave label will be highlighted, however, labels on the bottom of screen keep unchanged, which doesn't mean they are sub-catalogs of Wave because sub-catalogs for Wave label are Type and Params.) When the label on the right includes more than six options (that is more than 6 softkey sub-labels on the bottom of screen, icon will show on lower corner of the label), press the label again to access the next screen if you want to view more options.

2) **Sub-Labels on the Bottom of Screen:** When sub-label options belong to sub-catalogs of Type label on the right of screen, these labels will be highlighted if selected. If sub-label options are sub-catalogs of Params Label on the right of screen (or sub-catalogs of one of Ch1Setting, CH2 Setting, I/O (or Freq Meter) and System labels poped up after pressing Utility button), you will find these sub-label options correspond to the parameters one by one in the parameter list and are also marked around the edges with the same color with that of the current channel(it is grey when setting the system) and with words in pure white (words in parameter list turn white if selected) if the sub-label has been selected; if you press sub-label softkeys or multipurpose knob at the moment, the sub-label labels will be highlighted to indicate that the parameter that corresponds to the sub-label is ready to edit. Use the multipurpose knob if you want to modify the parameter, then press the

knob to confirm and eixt the editing after the setting is finished. If the sub-label has been “selected” but not under editing status yet, turning the multifunction knob or pressing arrow buttons can allow you to toggle between different labels (switch between different parameters accordingly in parameter list); To modify parameter with digits and units under selected or editing status, you can also enter the numbers directly using the numeric keypad (Left arrow button can be used to clear the digit prior to the current input) and select desired unit on the bottom of screen, then press the sub-label softkey or multipurpose knob to confirm and exit the editing.

■ **Waveform Parameter List:** All parameters related to the current waveform will be listed on the screen. If one of parameters turns white, it indicates you can set up the parameter using menu operation softkeys, numeric keypad, arrow buttons and multipurpose knob. If the current character has the same color with that of the current channel (it is white when setting the system), it indicates the character is ready to edit using arrow button or numeric keypad or multipurpose knob.

■ **Waveform Display Zone:** To display waveform graphic with the current settings of the channel (you can identify which channel has been selected through checking the color or the highlighted display of CH1/CH2 information area. And the parameters on the left display of screen are related parameters of the waveform). **Note:** No wareform displays when setting the system, so the waveform graphic zone are left out for the parameter list.