GME3DE10

Terrestrial Digital TV Broadcast Exciter

Technical Manual

Version Number: V1.0

1. System block diagram

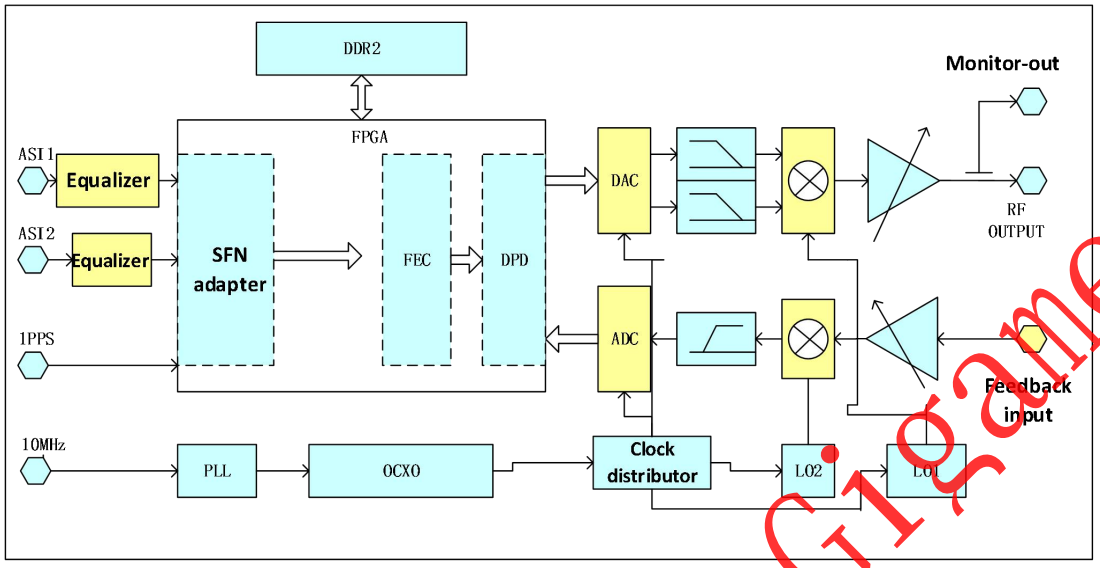


Figure 1 System block diagram

2 Product structure and interface

2.1 Front view of the unit

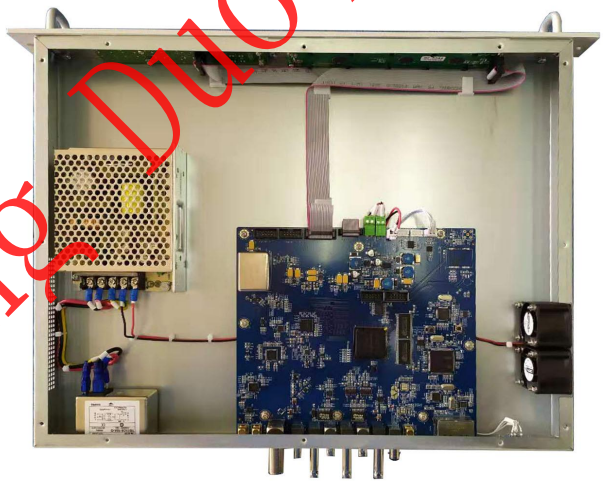


Figure 2 Internal view of the exciter

2.2 Front panel

Figure 3 Front panel

LCD screen	40 × 2 character with a backlit LCD screen
Function keys	Left, Right, Up, Down, ENTER, BACK
ASI-A indicator	TS stream input A indicator
ASI-B indicator	TA stream input B indicator
TsErr indicator	TS stream alarm indicator
GPS indicator	Reference clock source alarm indicator
RF indicator	RF output indicator
SysErr indicator	System alarm indicator
10MHz OUT	10MHz reference monitor output, BNC female, 50 Ω

2.3 Back panel

Figure 4 Back panel

RF IN A	Pre-correction RF input (after filter), BNC female, 50 Ω
RF IN B	Pre-correction RF input (before filter), BNC female, 50 Ω
RF MON	RF monitor output, BNC female, 50 Ω
RF OUT	RF output, N female, 50 Ω
RS485	Remote control, monitoring interface, RS485, DB9 male
RJ45	Ethernet port (REMOTE), for exciter M&C, support TCP and UDP
TSoIP	Reserve for TSoIP
10MHz IN	10MHz clock input, BNC female, 50 Ω
1pps IN	1pps input, BNC female, 50 Ω

ASI IN A	TS stream input A, BNC female, 75 Ω
ASI IN B	TS stream input B, BNC female, 75 Ω
ASI OUT	TS output, BNC female, 75 Ω
POWER	Power supply switch
AC 110V-220V	Power supply interface
⏚	Grounding terminal

3 Features and technical specifications

3.1 Features

1) Support GB20600-2006 standard in all modes and meet all requirements of GB/T28436-2012 standard.
2) Use adaptive digital pre-correction multi-dimensional non-linear pre-distortion and precision demodulation technology, with high-precision, fully automatic and adaptive linear and nonlinear pre-correction function.
3) Unique dual feedback input ports, which can simultaneously sample the output signals after the final-stage power amplifier and after band pass filter to achieve the pre-correction to PA linear/nonlinear distortion and passive components linear distortion at the same time, to further improve the quality of transmitting signal.
4) Real-time monitoring of output signal quality, and can automatically start pre-correction processing to ensure optimal working state when transmission system performance degrades.
5) Use direct digital RF broadband automatic balancing technology to achieve near-perfect modulation and frequency conversion, with MER greater than 52 dB, signal shoulder less than -60dBc, spurious inside and outside adjacent channel less than -55dB and -61 dB respectively, and superior phase noise performance.
6) Use adaptive output impedance matching technology to ensure impedance matching at the output end.
7) Support system-level AGC (automatic gain control) function to ensure the output power stability of the transmission system.
8) Real-time, continuous, automatic and high accuracy measurement of MER and shoulder level of final-stage PA system without additional hardware overhead, and provide local display, serial ports / network transmission function for remote M&C, greatly facilitate the on-site monitoring of the transmitted signal and provides a good foundation for unattended transmission system.
9) In MFN mode, it has the following superior functions: real-time input stream rate display,

built-in bit rate adaptive module, and high-precision PCR correction.

10) Real-time monitoring and display of the temperature inside the machine, as well as over-temperature protection.

11) Rich, intuitive and open user interface, supporting RS485 external control interface and provide a complete portfolio of communication protocols to facilitate the integration of transmission system.

12) Support remote upgrade via RJ45 port to complete the exciter system upgrades.

3.2 Technical specifications

Table 1 Physical specifications

1	Ambient temperature	Normal operation: 5-45℃ Permitted operation: 0~50℃
2	Relative humidity	Normal operation: ≤90% (20℃) Permitted operation: ≤95% (Non condensation)
3	Atmospheric pressure	86kPa-106kPa
4	Power supply	110V～220V AC: 50Hz-60Hz。
5	Dimension	482.6mm (D) *500mm (W) *44mm (H)

Table 2 Technical specifications

No.	Item		Measurement result
1	Frequency range		Meet GB/T 14433-1993
2	Frequency step size for SFN		0.25Hz
3	Frequency accuracy		MFN mode:≤±100Hz SFN mode:≤±1Hz
4	Output power		0dBm
5	Output power stability (24 hours)		±0.1dB
6	Roll-off factor		0.05
7	Shoulder attenuation (fc±3.2MHz)		-50dBc
8	Inband inflatness (fc±2.591MHz)		±0.2dB
9	Outband spurious	Unwanted emission inside the adjacent channel	50dB lower than inband useful emission
		Unwanted emission outside the adjacent channel	55dB lower than inband useful emission
10	Phase noise		-65dBc/Hz @10Hz -80dBc/Hz @100Hz -90dBc/Hz @1kHz -100dBc/Hz @10kHz

		-115dBc/Hz @100kHz -125dBc/Hz @1MHz
11	PAPR	Meet CCDF curve mask of GB/T 28436-2012
12	MER	40dB
13	Range of SFN delay adjustment	0-999.9999ms
14	Step size of SFN delay adjustment	100ns

4 Query and configuration of exciter parameters

The user interface for query and configuration of the exciter parameter is available through the LCD screen and keypad on the front panel.

Turn on the power and exciter will complete the startup and automatically enter the query mode 1 in about 10 seconds.

Under normal operating conditions, after about 60 seconds without keypad operation, system will automatically enter the standby mode, the LCD backlight automatically turns off. LCD backlight will turn on with any keypad operation. The main interface is as follows, Including STATUS, CUSTOM, NET, MANAGE, ADVANCE.

Once at the main menu, press the "Left" or "Right" buttons to move the cursor to the desired sub-menu, and press the "ENTER" button to enter the target sub-menu. Press the "BACK" button to return to the upper menu.

When in the corresponding sub-menu, press "Left" or "Right" button to move the cursor to the target parameter and then press the "Up" or "Down" buttons to select different options from the drop-down boxes.

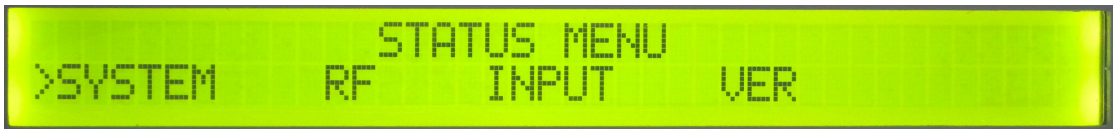
Once you have selected the desired option, press the "ENTER" button to apply and save, or press the "BACK" button to skip the changes and return to the upper menu.

4.1 Exciter STATUS menu

Under the main menu of STATUS, where the second line are system and RF, INPUT,VER.

1) SYSTEM, Under the MAIN MENU, select status on the exciter to enter the status query

interface, including system, RF, input, version:



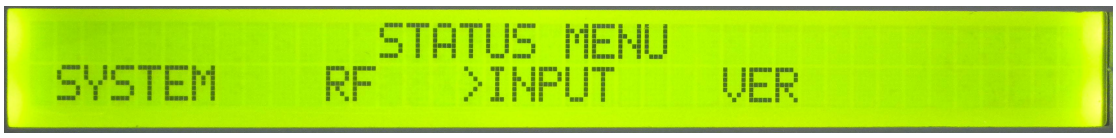
Once at the menu, press the "Left" or "Right" buttons to move the cursor to the desired sub-menu, and press the "ENTER" button to enter the target sub-menu. Press the "BACK" button to return to the upper menu.

The SYSTEM menu includes NET settings, GPS status, 1PPS status, SIP status and temperature:

2) RF, Under the STATUS menu select RF menu:

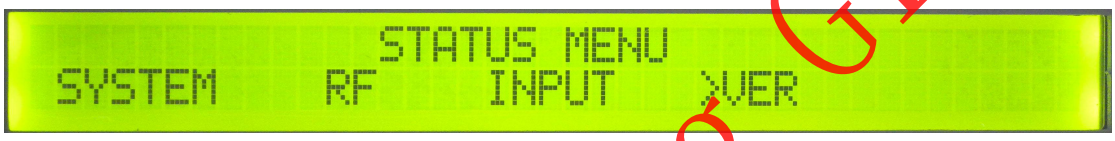
After entering RF menu, you can view the status of Frequency, Power, CW, RF, IMD and SNR:

3）INPUT, Under the STATUS menu select INPUT menu:

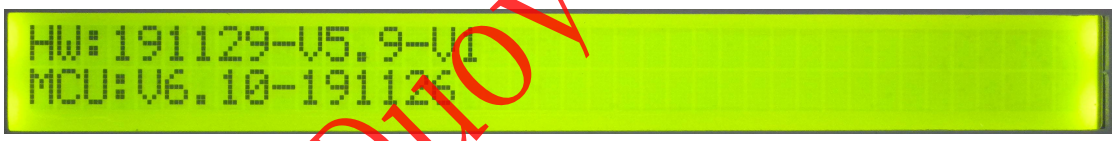


After entering INPUT menu, you can view the status of ASI1, ASI2, TUNER, IP:

4）VER, Under the STATUS menu select VER menu:



After entering VER menu, you can view the version of Exciter and MCU:



4.2 Exciter CUSTOM menu

Once at the main menu, press the "Left" or "Right" buttons to move the cursor to the desired sub-menu, and press the "ENTER" button to enter the target sub-menu. Press the "BACK" button to return to the upper menu.

When in the corresponding sub-menu, press "Left" or "Right" button to move the cursor to the target parameter and then press the "Up" or "Down" buttons to select different options from the drop-down boxes.

Once you have selected the desired option, press the "ENTER" button to apply and save, or press the "BACK" button to skip the changes and return to the upper menu.

Under the MAIN MENU, you can select CUSTOM setting query interface, including system,

RF, PREC, MODE, TSOIP:

1) Under the CUSTOM menu you can select SYSTEM menu and set NET, GPS, INPUT,ASIOUT,IPOUT,BW working mode.

2) Under the CUSTOM menu you can select INPUT menu.

After entering RF menu, you can set PREC, POWER and view the status of CW and RFOUT.

3) Under the CUSTOM menu you can select PREC menu.

After entering PREC menu，you can turn on or turn off the PRE-CORRECT switch.

4) Under the CUSTOM menu, you can select MODE menu.

After entering MODE menu，you can set FFT,PILOT,PN,PHASE,MAP，LDPC,INT and MD.

5）Under the CUSTOM menu, you can select TSOIP menu.

After entering TSOIP menu， you can set IP_LOCAL,IP_IN,IP_OUT and view the version.

4.3 Exciter NET menu

Under the MAIN menu, you can select NET menu.

After entering NET menu, you can set IP, MASK,GATE,DHCP,ID and BPS.

4.4 Exciter MANAGE menu

Once at the main menu, press the "Left" or "Right" buttons to move the cursor to the desired sub-menu, and press the "ENTER" button to enter the target sub-menu. Press the "BACK" button to return to the upper menu.

When in the corresponding sub-menu, press "Left" or "Right" button to move the cursor to the target parameter and then press the "Up" or "Down" buttons to select different options from the drop-down boxes.

Once you have selected the desired option, press the "ENTER" button to apply and save, or press the "BACK" button to skip the changes and return to the upper menu.

Under the MAIN menu, you can select MAGAGE menu.

After entering MANAGE menu, you can manage LICENSE, UPGRADE, RESTORE, VERSION.

1) Under the MANAGE menu, you can select LICENSE menu. After entering LICENSE menu, you can view the number of SN and LICENSE.

2) Under the MANAGE menu, you can select UPGRADE menu.

After entering UPGRADE menu， you can upgrade the software of MUC, TSOIP and FPGA.

3)Under the MANAGE menu, you can select RESTORE menu.

After entering RESTORE menu， you can restore parameters of exciter.

4)Under the MANAGE menu, you can select VERSION menu.

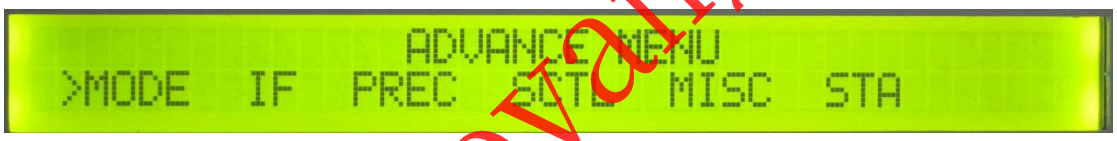
After entering VERSION menu， you can view the version of HW and MCU.

4.5 Exciter ADVANCE menu

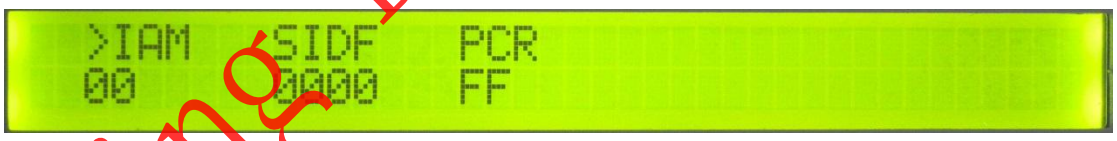
Under the MAIN menu, you can select ADVANCE menu.

Under the ADVANCE menu, there are MODE, IF, PREC, SCTL, MISC and STA submenu.

1) Under the ADCANCE menu, you can select MODE menu.



After entering MODE menu， you can set IAM,SIDF and PCR.



2)Under the ADCANCE menu, you can select IF menu.

After entering MODE menu， you can set SCV, RSPD, RAMP_UP and RAMP_DOWN.

3)Under the ADVANCE menu, you can select PREC menu.

After entering MODE menu， you can set the parameters of pre correction.

4)Under the ADVANCE menu, you can select SCTL menu.

After entering MODE menu， you can set PS, PPS and ASI.

5)Under the ADVANCE menu, you can select MISC menu.

After entering MODE menu， you can set the parameters of MISC.

6)Under the ADVANCE menu, you can select STA menu.

After entering STA menu， you can set the parameters of STA.