GME1F13 1KW

FM Transmitter Manual

1. SYSTEM INTRODUCTION

GME1F13 FM 1KW Transmitter has solid function and advanced technology, and is easy to operate and maintain.

1.1 System features

- LDMOS solid-state technology.
- Perfect protection measures to ensure the safe operation of equipment, with a VSWR, temperature, over-drive protection.
- Modular design for flexible selection of multiple exciters.
- "Integrated" design, small size, easy installation, the machine is a minimum standard 19 "8U cabinet, you can also choose 2 meters 19" rack cabinet to install two transmitters in standby multi-transmitters.
- Intelligent monitoring system, LCD display operating parameters.
- RS485 interface, you can achieve remote control. Remote control software can be customized by the user or develop their own software.
- Simple, just turn on the power switch of amplifier unit, boot action finished.

1.2 System Makeup

The transmitter is divided into two parts: the exciter and amplifier unit. Block diagram is shown below. Amplifier unit is also the data processing and control unit, it can complete external communications and feedback to control exciter, and display data of transmitter.

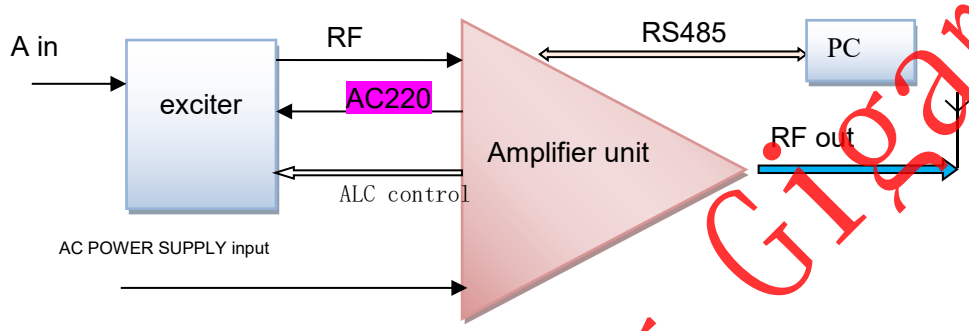


Figure-1

GME1F13 is the two standard 19 "rack, placed from top to bottom. The top part is the exciter compartment (single exciter). Here is a 5U amplifier unit whose placing order can be changed. Lightning protection devices and input switch are in the back of the cabinet. The following figure shows 1.3M network cabinet layout photo.

Figure 2 layout photo

2. AMPLIFIER UNIT

Amplifier unit mainly consists of power amplifier modules, detectors board, SMPS and central control. The main function of amplifier module is to amplify and transmit RF signal modulated from excitation, and directional coupler pick up part of RF signal, and send to the detector board. Detector board is responsible for handling the RF signal changed to DC detection voltage, respectively sent to central control board and exciter. Central control unit collects signal inside the amplifier, including amplifier's operating current, voltage, temperature conditions of the radiator, the unit output power, reflected power; Central control board is also responsible for communication with the detection board, exciter and the outside top unit. SMPS is responsible for converting the AC power into a stable DC power supplied to the amplifier module, central control board, and wave detection analysis.

2.1 Amplifier block diagram:

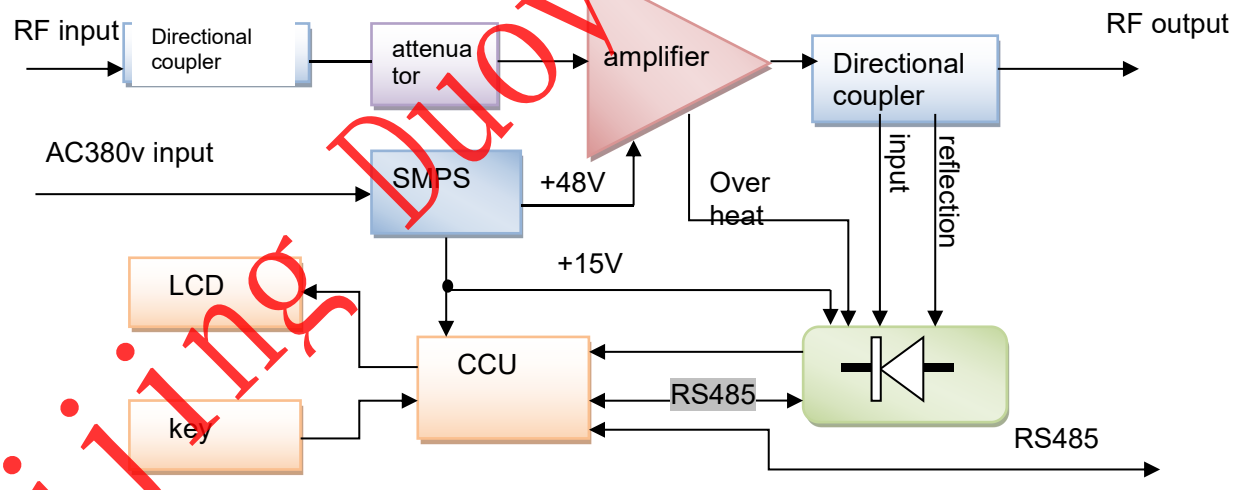


Figure 2-1

2.2 Front panel

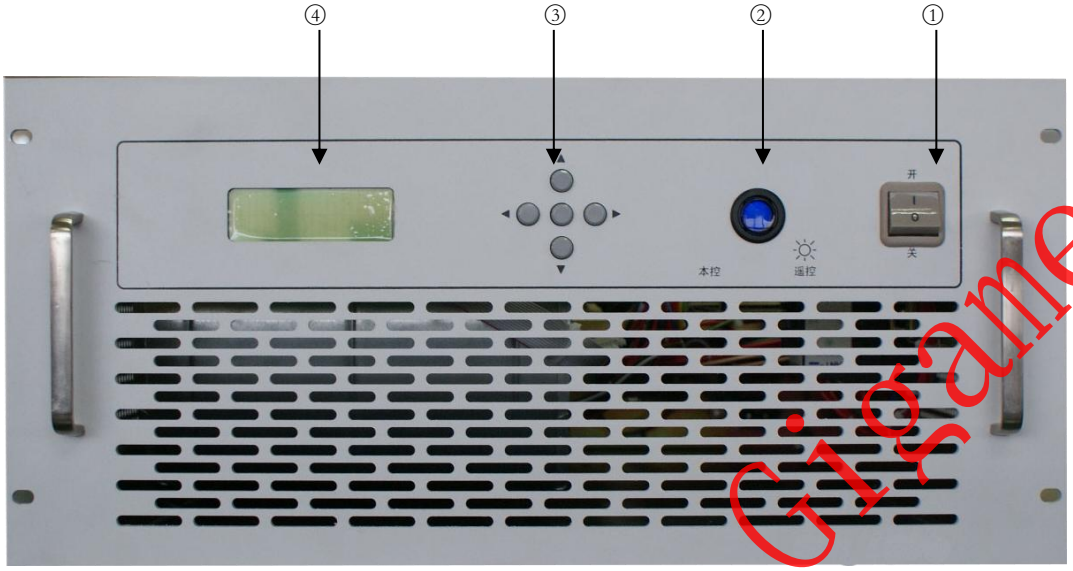


Figure 2-2

① **Power switch：**

ON/OFF（Or switch on/off via the remote control interface, 1KW unit has a remote control interface）

② **Local and remote control switch**

When you press the button, it is a local control state. You can directly switch the transmitter; button ejected while the button is lit, then the transmitter is remote switch status.

③ **Keys**

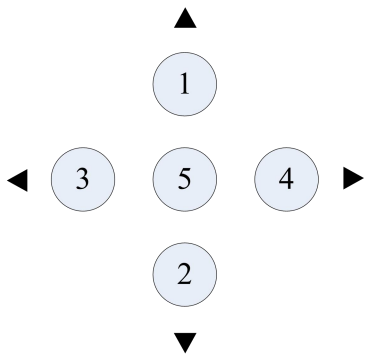


Figure 2-3 GME1F13 operating keys

1:up；2:down；3:left；4:right；5:OK；

④ **LCD**

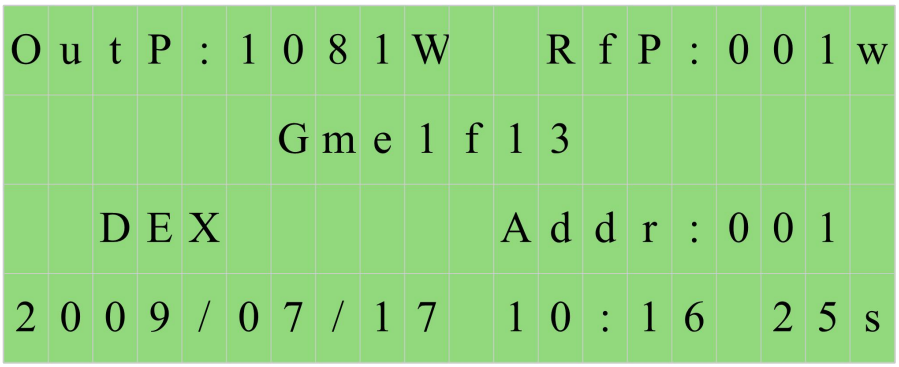


Figure 2-4 GME1F13 LCD

Parameters：

Name	Description	Name	Description
Outp	Output power	Addr	address
RFP	Reflection power	DEX	Exciter type

2.3 Rear panel

Figure 2-5 GME1F13 amplifier unit rear panel

Name, meaning and purpose of the rear panel interfaces

Item	Meaning and Purpose	Remark
1	RF in	N-50K
2	RF out	L29-50K
3	AC380V	L→1, 2, 3 N→ 4
	AC220V	L →1, 2 N →2, 4
4	220V out	Power for exciter
5	Computer	RS48 interface for connection between transmitter and computer
6	EX ALC	sent detection voltage to exciter as ALC loop control
7	EX COMM	RS485 interface for communication with exciter

2.4 Amplifier module

The amplifier is a broadband amplifier for FM broadcasting, frequencies in the 87 ~ 108MHz can be changed without any adjustments to the amplifier. In Last stage two imported 600W LDMOS power devices MRFE6VP5600 are adopted to form balancing amplifier, which is good isolation from each other, big redundancy, high reliability. Amplifiers include temperature compensation circuit to ensure that the amplifier output power stability, low temperature drift.

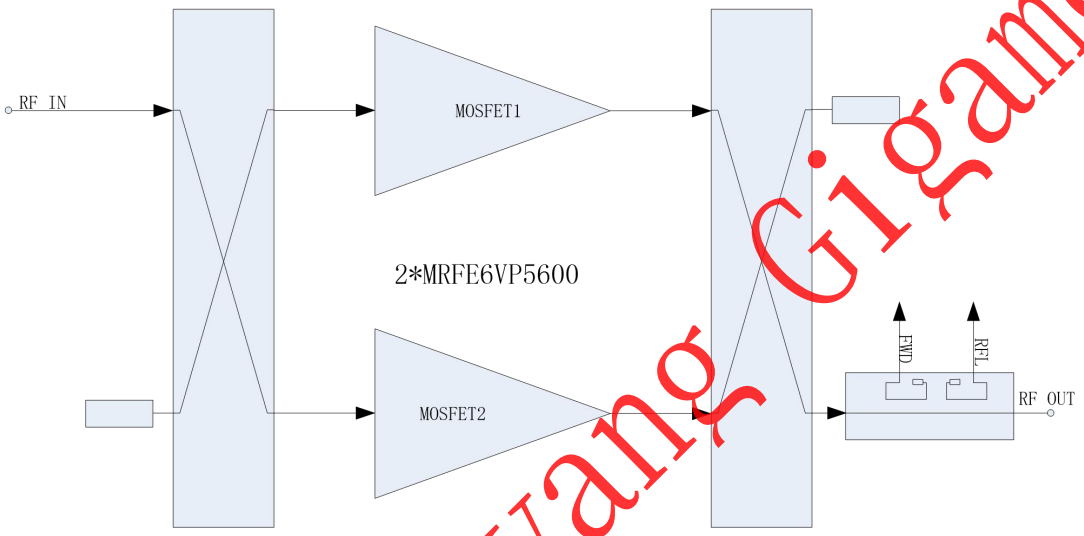


Figure 2-6

2.5 Detection board

Two main function of Detector board: First, change RF signal to DC voltage; Second, according to relation of specific power, frequency and detection voltage, correction DC detection voltage is a linear relation with power. System block diagram as follows:

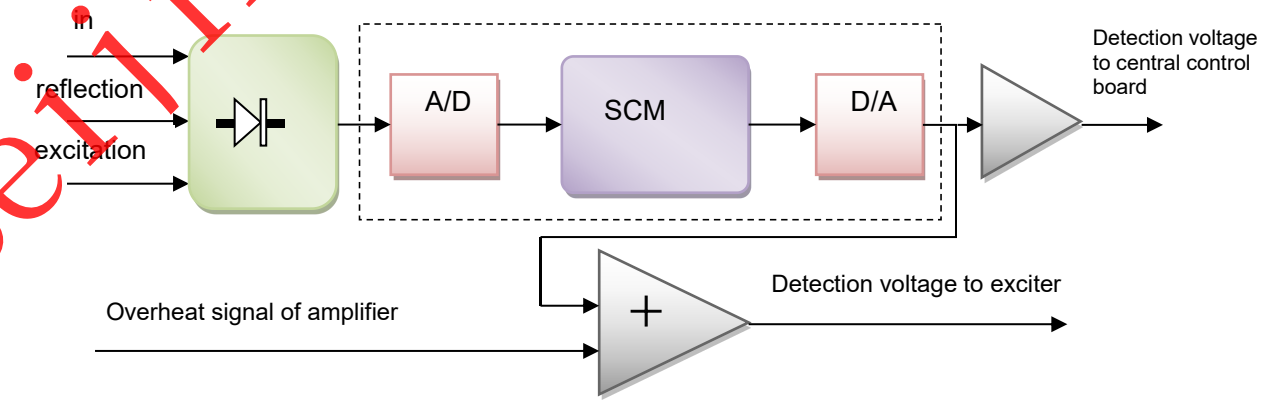


Figure 2-7

Three-way RF signal through three detectors (IC) is converted into a DC voltage sent to SCM for A / D conversion, after SCM software calibration, then D / A outputs DC detection voltage corresponded with power. This voltage is then divided into two routes: one route to central control unit as power indication, the other added with overheating signal of amplifier by adder to get feedback voltage for ALC to be sent to exciter . When the amplifier overheating signal is low level, detection voltage for exciter is normal calibrated detection voltage related to power. And when the amplifier overheating signal is high level, detection voltage for exciter is in fact the voltage containing the amplifier overheating protection.

2.6 Central control board:

M&C7 (or M&C8) control board is the core of central control unit, using AT89C55WD as the main control chip, configured with input channels, the system clock, memory and RS485 interfaces; people and machine interaction function is realized through panel keypad and LCD. The communication between PC and internal prats of transmitter is achieved via RS485 interface. Block diagram shown in Figure below.

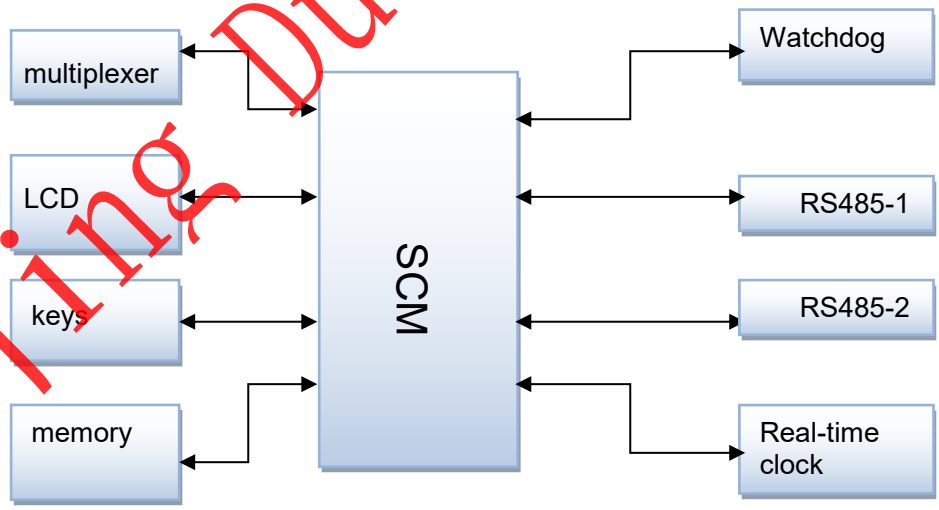


Figure 2-8 system block of central control board

3. INSTALLATION AND OPERATION

3.1 Installation

➢ Unpacking and checking

Please check goods carefully according to packing list after unpacking to see whether or not the goods is consistent with the packing list, damaged, significant deformation. Please contact with us if problems are found.

➢ Necessary conditions for Installation of equipment

AC power supply: There is a power distribution cabinet for transmitter in the equipment room, load capacity meets the requirements; the separate disconnect device ensures that in an emergency the transmitter AC power can be cut off. AC Power is 380V/50Hz or 220V/50Hz (selected when user place order). If AC voltage varies more than ± 15%, there is the need to increase the AC automatic voltage regulator.

Safety grounding line: It is a must to have reliable safety grounding line in the equipment room. To ensure long-term safe operation of equipment, equipment needs to be connected safely with safety grounding line in equipment room.

Antenna or dummy load: VSWR<1.2.

Wiring (refer to wiring diagram)

- RF output connection: the transmitter installation, first RF output line is connected to an antenna or load, and then RF output line of exciter is connected to the input terminal of final amplifier or dummy load, which is to prevent the transmitter misuse to damage the amplifier when transmitter is off. RF cable for exciter and amplifier, transmitter RF output and the antenna (or dummy load) must be connected securely. Before connecting the antenna VSWR need to be confirmed in order to ensure long-term safe operation of equipment, VSWR≤ 1.2.
- Audio Signal Input: audio input adopts XLR interface, audio signal line connection: 1, grounding; 2, the positive or negative; 3, negative. XLR pin

arrangement referred to the following figure.

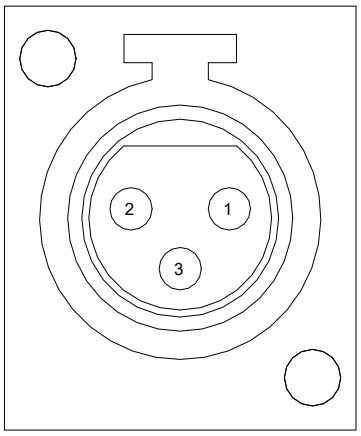


Figure 3-1 rear view of audio input interface

- Communication line: RS485 communication cable is used for connection between exciter and amplifier. There is no communication line when using BLUES30NV exciter. The transmitter's external communication line adopts RS485 standard, physical interface DB9-J.
- ALC control line: ALC control lines are used to control the transmitter output power, and must be connected; otherwise it may overdrive, and damage the amplifier.
- Safety grounding line: for the safe operation of transmitter, transmitter case should be safely connected with the safety grounding in equipment room. After the wiring is completed and checked correctly, you can boot operation.

3.2 Transmitter operation

➢ Local switch ON/OFF, frequency adjustment, power adjustment.

Boot: turn on power switch in the front panel of the transmitter main part, the exciter and amplifier are on at the same time to complete the boot.

To confirm the operating frequency and power settings of exciter when booting at the first time, adjusted by the keys on the panel of exciter. When the equipment is shipped, it has been adjusted to the rated, so the user site according to the contract, usually no need to be adjusted on users' site.

➢ refer to exciter's manual for detailed setting method

Switch off: As long as the power switch on the front panel of the amplifier is put to "OFF" , the power of transmitter is cut off, and in OFF condition.

➢ parameters monitoring

Via the LCD and menu selection, equipment operating parameters of GME1F13 can be shown, including the input power, reflected power, the final stage amplifier voltage, amplifiers total current and other parameters. Exciter has separate display. The equipment's main SCM software is relatively generic, which can be used for the same structure of FM 500W and FM 1KW.

➢ LCD manual of transmitter

panel layout of the transmitter as shown below:

The default display

In default condition, the LCD of transmitter as shown below:

O	u	t	P	:	5	0	8	W			R	f	P	:	0	0	1	w
						G	m	e	1	f	1	3							
		D	E	X						A	d	d	r	:	0	0	1		
2	0	0	9	/	0	7	/	1	7		1	0	:	1	6		2	5	s

Meaning of letter shown above：

“OutP”: output power，

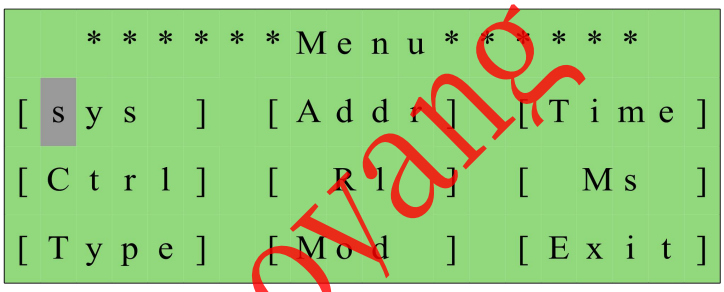
“RfP”: reflected power，

“GME1F13”: transmitter model.

“DEX”：Here refer to the selected exciter type, DEX represents digital processing exciter. The transmitter currently supports three types of communication protocols which are DEX, GME, RVR; There are four types of exciter that can match with above protocols.

“Addr”：transmitter address for remote communication, in the "Addr" menu settings can range from 1 to 255.

When the key in the middle of panel is pressed, the next menu is shown:



In this menu, select the menu in the block, press OK to enter the submenu. There are seven options in the current menu, the meaning as follow:

“SYS” ：Parameters of transmitter system shown.

“Addr”：Setting of transmitter communication address.

“Time”：Time setting of transmitter

“Ctrl”：Setting of transmitter controlling method, invalid in current transmitter, DO NOT SET

“RI”：Transmitter central control information, including software and hardware.

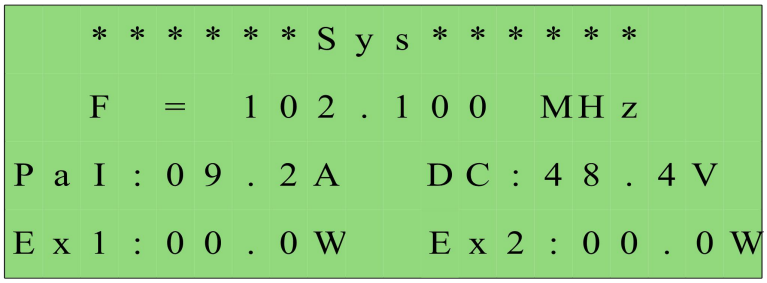
“MS”: Condition of main/standby transmitter, for commission only when main/standby exciter is configured.

“Type”: Transmitter model.

“Mod”：Selection menu of exciter model.

“Exit”：Back to previous menu.

“SYS” menu

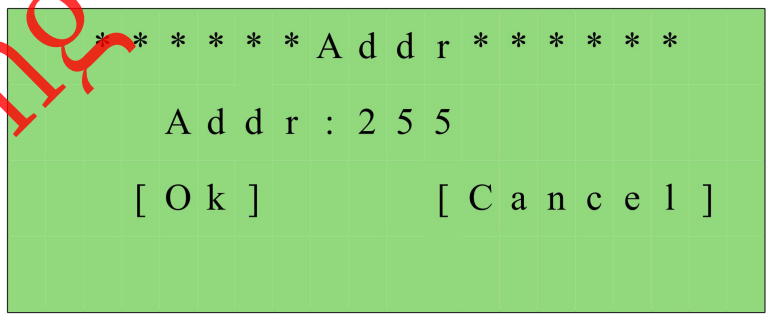


SYS menu shows main parameters of the four transmitters:

- "F" the transmitter current frequency, may be automatically read or may also be set manually according to the exciter type .
- “PaI” amplifier current, 25~30A at 1KW.
- “DC” amplifier working DC voltage ,48~50V
- “Ex1” output power of main exciter, vary with frequency;
- “Ex2” Output power of standby exciter, invalid in single exciter.

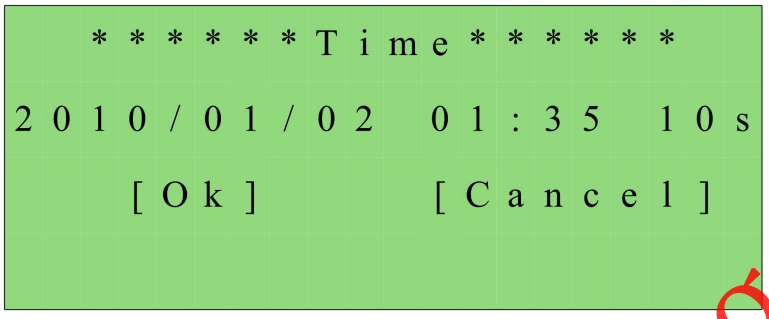
“Addr” menu：

"Addr" menu is mainly used to set the transmitter communication address. No need to set when a computer monitor is not connected. Address range can be set from 1 to 255 according to the user’s specific system;



“Time”: menu

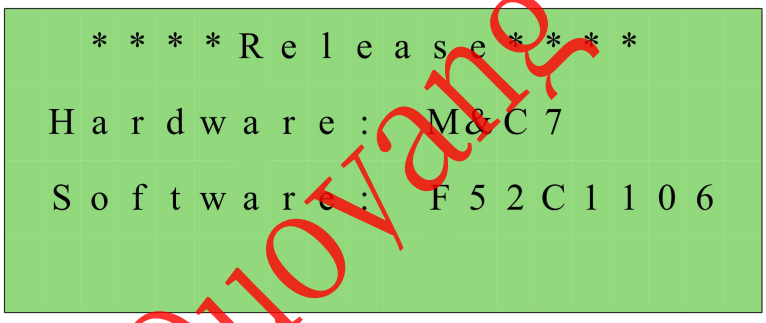
In this menu you can set the date and time , the format (Year / Month / Day: min: sec)



“Ctrl”：menu

Set transmitter control method: invalid in this transmitter

“R1” ：menu



The second line is the hardware information of control board , the current is M & C7;

The third line is software information, the current is F52C1106.

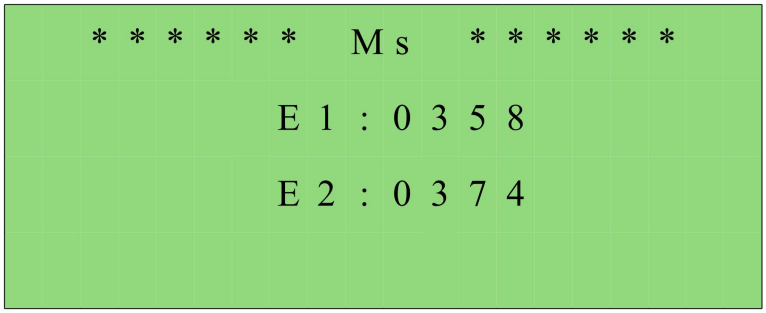
“MS”：menu

When there are main/standby exciter, this menu is useful for commissioning main/standby exciter

E1：detector voltage at RF test port of main exciter

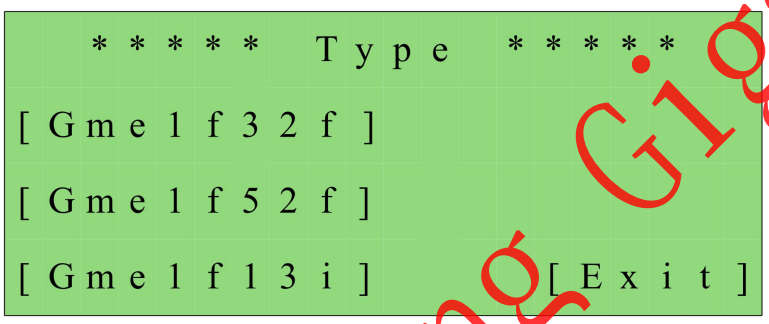
E2：detector voltage at RF test port of standby exciter

000． 000 is the working frequency of exciter, only valid when exciter with communication interface is chose.



“Type”：menu

"Type" menu mainly set the current model of transmitter, shown on the default page.



“Mod”: menu

MOD menu mainly set exciter model used in transmitter. The central control software of current version can support three kinds of exciter with a communication interface, can also support without communication interface. Wherein the exciters can be supported are:

3.3 Transmitter protections

The transmitter has two kinds of protection, i.e. overload and overheating protections. If the antenna VSWR is too big, the transmitter phenomenon is that output power becomes smaller, exciter shows beating of output power. There is no obvious indication elsewhere.

When there is overheating protection, the panel has "OVER HEAT" indication. And there is a relatively high voltage output at forward detection voltage of the ALC control interface. Exciter power output goes down.