

FM Transmitter

INSTRUCTION MANUAL



Guilin Aiwei Electronic Equipment CO.,Ltd.

ADD: No.13-1,Kongming Road Guilin P.R.CHINA

Tel:+86 773 5810860 3938225 Fax:+86 773 5810860

<http://www.cn-aw.com>

E-mail:aiwei@cn-aw.com

AW FM Transmitter

PART ONE PREFACE

AW FM Transmitter is professional high quality equipment of FM broadcasting, which is produce and develop adopt national the most advanced technical, newly appliance. Such FM transmitter can change broadcasting signal which come from broadcasting signal received by NICAM-728 satellite broadcasting digital sound decoder, self-manage cablecasting audio frequency signal and audio signal send by acoustics equipment into broadcasting signal. Through antenna transmit to terminal user.

It bears perfect, full high keep real sound quality, very low noise and deepest out band restrain; completely satisfy the demand of FM transmitter sent out FM signal.

Main characteristics:

1. Adopt advanced digital frequency synthesized technical, carrier frequency PLL synchronous locking phase.
2. Standard type adopt CPU MPU, optional prefabricate and memorize frequency point, LED digital tube synchronous display output frequency.
3. Adopt CPU MPU directly control MIC, AUX, CD, ST/MO state.
4. Frequency prefabricates directness, convenience and speediness.
5. Full state, all power tube adopts import original high-power tube.
6. Setup multilevel band filter and low filter, bear high harmonic suppressed degree.
7. The box adopt international standard box's structure, beautiful design, digital control equipment specialty machining.

PART TWO TECHNICAL SPECIFICATIONS

1. Operating frequency: 87~108MHz in step 100kHz
2. Load impedance: 50Ω L16 connector
3. Spurious emission: <-65dB
4. Output power: 30W 50W 100W
5. Frequency deviation: ±75kHz
6. Pre-emphasis: 50μS
7. FM S/N: ≥60dB (when 1kHz, ±75kHz frequency deviation)
8. Frequency responds: 30Hz~15kHz ≤0.5dB
100%modulation frequency deviation ±75kHz
(Maximum ±100kHz)
9. RF Harmonic: <-65dB
10. Spurious AM noise: ≤-50dB
11. Harmonic distortion: 30Hz-15kHz ±75kHz when frequency deviation ≤0.3%
±100kHz when frequency deviation ≤0.5%
12. Audio signal frequency character: (40Hz-15kHz) ≤±0.5dB 100% modulation frequency deviation ±75kHz
13. Sub-carrier suppression: ≤-45dB
14. Audio input level: 0dBm/+10dBm

-
- 15. Audio input impedance: 10K Ω /600 Ω balanced optional
 - 16. Level difference between L&R channel: 30Hz~15kHz \leq 1dB
 - 17. Separation of L&R channel: 100Hz~10kHz \geq 40dB
30Hz~15kHz \geq 40dB
 - 18. Voltage: AC 220V \pm 10% 50Hz \pm 2Hz
 - 19. Power consumes: \leq 200W
 - 20. Service conditions: ① Ambient temperature: -10 $^{\circ}$ C~+40 $^{\circ}$ C
② Relative humidity: 25 $^{\circ}$ C 90%
③ continue working time: 18 hours
 - 21. Carrier acceptability deviation: \leq 200Hz
 - 22. Dimension: 482 (W) \times 400 (D) \times 160 (H) mm

PART THREE OPERATING PRINCIPLE

1. Principle of modulation (PICTURE ONE)

the whole box is compose of eight parts , there are CPU control frequency synthesis FM modulator、digital display、87-108MHz filter amplification、former-class driver、former-class power amplification、end-class power amplification、 power supply.

87-108MHz filter amplifier is compose of band filter、similar axis adjustable attenuator、integrated amplification and low filter.

RF signal output by one frequency point of FM modulator, fended to filter amplifier by cable, first through band filter filtration, HF changeable attenuator adjust output range, and then sent into 2N1 integrated amplification amplify,

Through low filter send to power amplification, and second through low filter to antenna.

Cause 2N1 adopt U.S.A. MOTORLA's UHF low-noise integrated amplification module, so amplifier is low noise, good HF performance and stable, reliable.87-108MHz band filter adopt QIEBIXUEFU function equal veins filter, enjoy the favorable outside-band character, efficiently restrain harmonic.

As a result of the pure frequency spectrum of press control oscillator VCO, high suppressed degree band filter, besides collocate multilevel low filter suppress higher harmonic, make the whole set frequency character 87-108MHz in-band level definitely excellent, out-band suppressed degree over 70dB, little harmonic.

digital frequency synthesis FM modulation is compose of press-control oscillator(VCO)、locked ring (PLL)、 microprocessor (CPU) and dispaly(LED).

Press oscillator (VCO) is link into LC oscillator by transfiguration diode and inductance. its oscillate frequency F changing along with the added voltage of two point. VCO oscillation frequency dividing frequency (F/n) N times by per-divider, and then dividing frequency N times by procedure divider, last send to monitoring phase.

Inside the phase lock looping set up norm crystal oscillator, its oscillation frequency is f , after dividing frequency M times (f/m) by divider, is send into monitoring phase. Compare in second road signal monitoring phase, monitoring phase distinguish this two road normal phase difference, produce error voltage ΔU , control press oscillator's oscillation frequency by low filter. When looping locked, this two-road signal frequency which send into monitoring phase are equality. That is:

$$F/n \cdot N = f/m \dots\dots\dots (1)$$

$$\text{two side of equation equally multiply}(n \cdot N): F = \frac{F \cdot n \cdot N}{m} \dots\dots\dots (2)$$

in (2), F is press control oscillator's oscillation frequency, f is norm crystal oscillator's oscillation frequency, it is high extract ratio, perfect stability constant, n and m respectively as two divider's dividing frequency time, and also the changeless constant, VCO' oscillation frequency F just relate to procedure divider's dividing frequency, N change, F change.

Code of frequency division N , with 87-108MHz and 0.1MHz 210 frequency point is stored in the microprocessor, which receives the signal when pressing the controlling key of a certain frequency point. Meanwhile, the microprocessor will send the corresponding signal of frequency division N to the proceeding frequency divider and control it in order to make the oscillator reach the appointed local one, moreover, it will firmly lockup N . Its veracity and stability can be compared with high precision crystal oscillator, which can reach more than 10^{-6} .

Output frequency correctly in-phase display by 4 LED digital tube.

2. Voltage Controlled Oscillator

Included VCO, amortize amplification, output amplification and so on. VCO correspond with capacitance adopt import PHILIPS HF low noise tube as oscillator, oscillator output class as amortize class, work as segregate, amortize level output signal output to amplification level, and amplify adjusted carrier wave to proper level, output by two road, one road is send to CPU control's phase lock looping make up of phase locked loop work as steady frequency, another send to back amplification.

3. Stereo coder (PICTURE TWO)

Our company's Stereo coder adopts 14level soft switch coder. This coder do not need often operation control switch, directly setting inside "input level sampling", "pre-emphasis", "lead frequency". Audio signal of L&R through 10dB attenuator switch K1 separate sent to respective amplification IC1 and IC2. Temporality through switch separate send to low-high input level different predetermined.

Low input level: 0dBK1: 01011010 0dB attenuation

High input level: 10dBK1: 10100101 10dB attenuation

IC1、IC2 change balance double port input signal into imbalance's single port output, through low filter send to amplification IC3、IC4, after amplify, L&R signal send to resistance net R1-R4 process level distribute, and the level which after distribution add field effect tube Y1-Y8. Beside switch tube grid control by pulse distributor of encoder', in one period of

sub-carrier, distributor send out 14 pulses, make 8 tubes lead pass as required relative order. Audio signal of L&R through switch according to difference level proportion and time.

4. 30power amplification

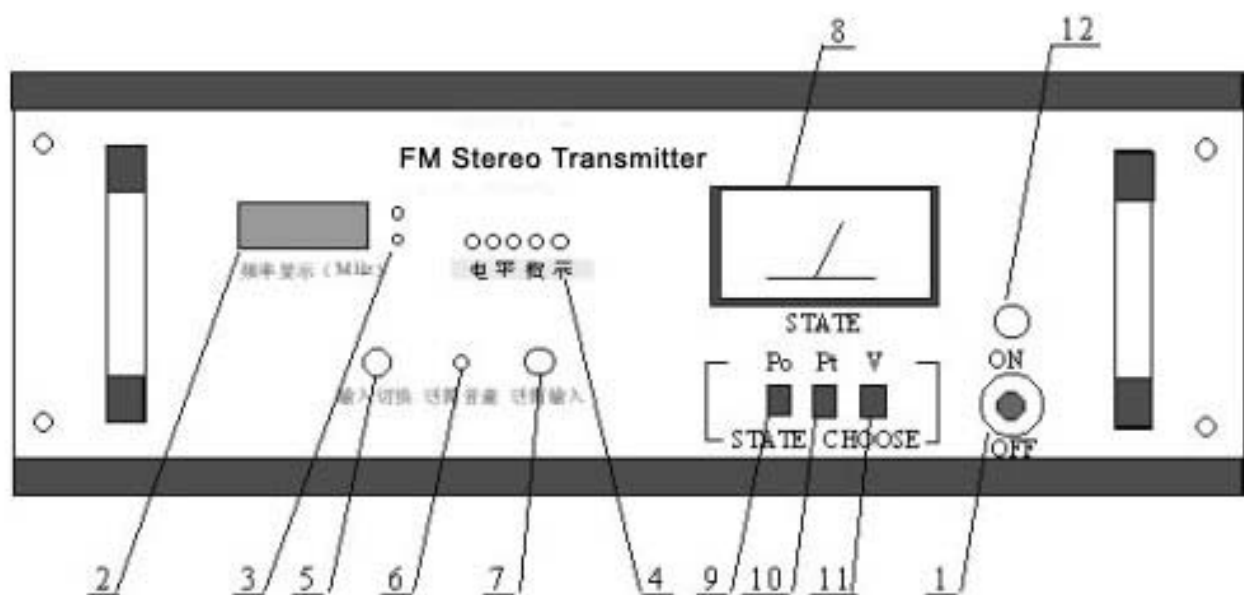
30W former class drive by PHILIPS power amplification module, 30W work in second state by PHILIPS power amplification tube BLF173. operation electric current is 2~2.5A, voltage is 28V. circuit adopt microband structure, high stability, high storage, power can reach over 40V. 30V power amplification location have power, current and voltage's indicate circuit, supply for meter head work as inspect and direction.

5. 30W power amplification

220V voltage output by transformer, through commutate, filter and sent into three point regulator LM338K、LM7812、LM7805, output +24V power supply and modulator offer voltage 5V,12V,24V. power amplification supply adopt import switch power supply 24V/4.5A.

PART FOUR PANEL ILLUMINATE AND ADUJSTMENT

1. Former-panel



Panel illuminate 1. Whole set switch

2. Frequency display
3. Frequency up, down adjusted key
4. Level indicator
- 5.circuitry/mike input switch
- 6.mike volume adjust
- 7.conference mike input
8. Meter head

9.10.11 three key's switch, respectively indicate output power(2)、driver power (3)、 power amplification voltage(4),the voltage is +24V.

12. Power supply indication

2.Adjustment

Output frequency adjustment

slow adjusted: press key 3 to adjusted, \triangle show frequency rise, ∇ show frequency down, every time press related key, frequency changed 0.1MHz.

Quick adjusted: if far different from original frequency and needed frequency, quick adjusted can be use,

Press 3 (up or down) key, frequency automatic press 0.1MHz quick advance, when near needed frequency, set free key 3, and then use slow adjusted method adjust to needed frequency.

After adjusted frequency, promptly deposit automatic.

State control 5 adjusted:

According to user's demand, press key5, input signal state switch in circuitry and mike.

PART FIVE PERFORMANCE AND MAINTENANCE

(一) notices when normal operating

1. Make sure power supply normally working, value $220V \pm 10\%$
2. Forbidden open box' cover board and insert RF output plugs when the machine working
3. Setting prevent thunder device near the engine room, try every possible way to prevent thunder of power supply.
4. FM transmitter output frequency point's select should avoid local strong plough TV signal、 FM broadcasting and communication signal, should pay highly attention to prevent thunder, at turnover line of supply need to add arrester, on the top of antenna add lightning rod, lightning net connect earth resistance $< 4 \Omega$ 。
- 5.Once have adjust track level and RF output range, please don't move it, avoid affect the whole set's normal operating.
- 6.receive antenna should avoid electric power supply, avoiding induce 50Hz mis-wave, affect quality of rebroadcast.
7. Carefully read through the manual before use; well know the equipment's character and performance before setup. Make sure connect well transmit antenna or fake-load before setup, or damage output high-power tube.

(二)maintenance and trouble settle

1.this equipment belong to microcomputer control's HF equipment, its maintenance and trouble settle should process on the basic fully know its performance and priciple of operating, forbidden blindness use and increase the trouble.

2. Non-original net inside the machine, such as filter, matching circuit, all have been adjusted fine before leave factory, so, please don't move it when general repaired.

3. In order to prove stability and security of the whole set, also for easy to maintenance and repaired, every part of this FM transmitter's design adopts module structure, once confirm the trouble module, and just change it.

(三)commonly trouble and trouble remove.

1. Track no signal output

A. Receiver setting sound quiet, no noise, that is say there are RF output, but no modulate signal check: track audio frequency connecter, track audio frequency plug, audio frequency signal original no audio frequency output.

B. Receiver makes noise that is no RF output.

Check: power supply plugs, switch, fuse, RF output socket, plug, link line, mixer and output frequency indicate whether identical with acceptor' frequency.

C. Happen by frequency indicate digital tube shining (have supply), frequency indicate stroke completely or incompletely (lack stroke), but no RF signal output, it is possible cause circuit meet strong interfere, make the phase lock looping lose lock, just need to off the power supply, wait for second, dredge power supply, make the machine can work normally, if still no

Output, enter into next repair' process

2. There are noise or cluster sound when system rediffusion, should shut off FM transmitter's supply, continue monitor is it any other TV or HF signal interfere on this frequency point, eliminate it after check out or change this FM transmitter output frequency point to another no interfere blank frequency point.

3. Setup system, The reflection instructs in a big way, so, need to check is it correctly setting the antenna, antenna setting must be operate strictly according to manual. Notice: antenna input, standing wave ratio: $S \leq 1.2$.

PART SIX COLLOCATIONS

1. AW-30 30W FM Stereo Transmitter	1 UNIT
2.L.R AUDIO CONNECTION LINE	2 PCS
3. 250V 2A	2 PCS
4. 30 W INSTRUCTION MANUAL	1PC
5. CERTIFICATE OF QUALITY	1PC
6. FEEDBACK TABLE	1PC