

INSTRUCTION MANUAL FL-6010



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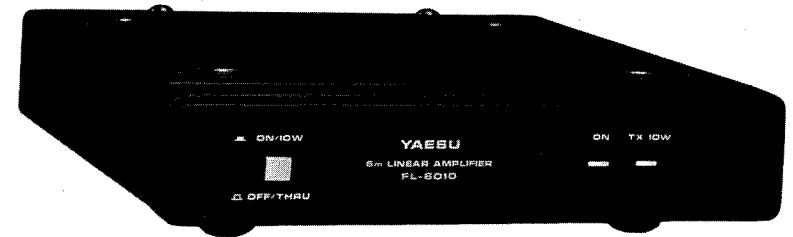


ACCESSORIES

Connection Cable A	(T9101270)	1
Connection Cable B	(T9100910)	1
DC Power Cord	(T9002805)	1
Spare Fuse 5A	(Q0000005)	1

MEMO

FL-6010 6 METER LINEAR AMPLIFIER



The FL-6010 is a compact 6 meter linear amplifier designed to match the FT-690R, providing an output of 10 watts through the 50 – 54 MHz range.

The FL-6010 can be mounted with the MMB-11 mounting bracket, allowing you to use the FT-690R as a mobile unit. For base station operation, you can place the FT-690R on top of the FL-6010.

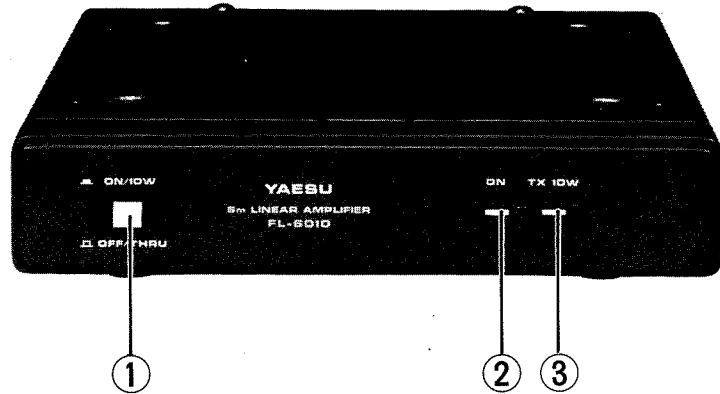
SPECIFICATIONS

Frequency coverage:	50.0 – 54.0 MHz
Modes of operation:	SSB, CW, FM, AM
Power output:	10 watts (at DC 13.8V; Drive power 2.5 watts)
Maximum drive power:	3 watts
Input impedance:	50 ohms
Output impedance:	50 ohms
Spurious radiation:	Better than 70 dB
Power requirements:	13.8V DC, negative ground (12.4V – 15.2V)
Power consumption:	3A (at 10W RF)
Case size:	150(W) x 30(H) x 170(D) mm
Weight:	0.7 kg (approximately)

Note: The above specifications were measured with the FT-690R.
Specifications subject to change without notice or obligation.

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FRONT PANEL SWITCH AND INDICATORS



1. POWER switch

This switch activates the FL-6010. When pushed, a 2.5 watt RF signal from the transceiver is amplified to 10 watts. When this switch is in the off position, the RF output from the transceiver is fed through relays to the ANT jack.

2. ON indicator

This indicator illuminates when the POWER switch is pushed ON.

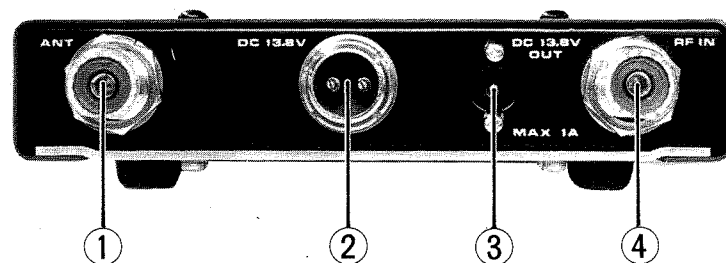
3. TX 10W indicator

This indicator illuminates when the transmitter is activated with the POWER switch in the ON position. If an antenna with an impedance of other than 50 ohms is connected to the ANT jack, the LED will not be illuminated, as the final transistor protection circuit will be activated.

		RESISTOR			
R201	J00245102	Carbon Film	1/4W	VJ	1kΩ
ACCESSORIES					
Symbol No.	Part No.	Description			
	T9002805	DC POWER CABLE			
	P1090019	(Power Plug FM-142P)			
	Q2000001	(Fuse Holder SN-1101)			
	T9101270	CONNECTION CABLE A			
	P0090020	(Coaxial Plug MP-3)			
	T9100910	CONNECTION CABLE B			
	P1090140	(Plug PJ-2)			
		SPARE FUSE			
	Q0000005	5A			

C102, 107, 109, 111, 122-124, 126, 130	K13170103	Ceramic Disc (DB201YF-103Z5L5)	50WV	0.01 μ F
C108, 110, 125	K40129004	Electrolytic (16RE10)	16WV RE	10 μ F
C106, 112	K40129016	" (16RE22)	" "	22 μ F
TRIMMER CAPACITOR				
TC102	K91000016	ECV-1ZW 50x32	50pF	
TC103, 104	K91000057	2222-808-32809	80pF	
INDUCTOR				
L101	L0020441			
L102	L1020121			
L103	L0020591			
L104	L0021026			
L105-108	L0021025			
TRANSFORMER				
T101	L0020588			
RELAY				
RL101, 102	M1190031	G2V-2-82P DC12V		
	Q5000011	Wrapping Terminal C		
TP TERMINAL				
	Q5000038	TP-i		
LED UNIT				
Symbol No.	Part No.	Description		
PB-2287	F0002287	Printed Circuit Board		
	C0022870	PCB with Components		
LED				
D201	G2090136	TLG-205		
D202	G2090137	TLR-205		

REAR PANEL CONNECTIONS



1. ANT jack

This jack accommodates the PL-259 plug of your antenna feeder. The nominal output impedance is 50 ohms.

2. DC 13.5V

This is the power jack of the FL-6010. Connect the supplied DC cable to this jack.

3. DC 13.5V OUT

This jack provides a DC output of 13.5 volts for a transceiver. When the FT-690R is used with the FL-6010, connect the DC plug from the transceiver to this jack.

4. RF IN

This is the RF input jack of the FL-6010. Connect the transceiver output to this jack.

INSTALLATION

1. Connect the transceiver ANT jack to the FL-6010 RF IN jack, using the supplied cable "A".
2. Connect cable "B" to the DC 13.8V jack and the other end to the FT-690R DC jack. If you use a transceiver other than the FT-690R, be sure the maximum current drain from this jack is no more than 1 amp.
3. Connect the DC cable to the DC 13.8V jack. The RED lead should be connected to the POSITIVE terminal of the power supply, and the BLACK lead to the NEGATIVE terminal. Never apply DC voltage in reversed polarity, as serious damage may result.
4. Connect an antenna to the ANT jack, checking to be sure the impedance is 50 ohms. A high-SWR antenna connection will activate the built-in final protection circuit.

Note: The FL-6010 may not be used with transceivers other than the FT-690R when operating on the SSB mode, because the change-over relay is controlled by a DC voltage fed through the ANT jack to the FL-6010 RF IN jack. During transmission, the DC voltage is fed through the RF line from the FT-690R to the FL-6010 RF input, so as to activate the change-over relay.

On the FM mode, a built-in carrier controlled stand-by circuit activates of the relays.

WARNING

NEVER APPLY AC POWER TO THE REAR PANEL POWER JACK OF THE LINEAR AMPLIFIER. NEVER CONNECT A DC POWER SOURCE GREATER THAN 15 VOLTS TO THE REAR PANEL POWER JACK. ALWAYS REPLACE FUSES WITH A FUSE OF THE PROPER RATING. FAILURE TO OBSERVE THESE SIMPLE PRECAUTIONS WILL VOID ALL WARRANTIES ON THIS EQUIPMENT.

Note: When using a DC cable supply with the mobile bracket MMB-11 and the FL-6010 and the FT-690R, replace the 3 amp fuse with a fuse of 5 amps.

		TRANSISTOR			
Q104, 105	G3309451Q	2SC945Q			
Q106	G3320020L	2SC2002L			
		THYRISTOR			
Q103	G3090044	CW12B			
		DIODE			
D101, 102, 104	G2001880F	Ge	1S188FM		
D105, 106	G2090001	Si	10D1		
		RESISTOR			
R109	J01245152	Carbon Film	1/4W	TJ	1.5k Ω
R108, 111	J01245222	" "	"	"	2.2k Ω
R101, 106	J01245103	" "	"	"	10k Ω
R107, 112	J01245104	" "	"	"	100k Ω
R110	J10276560	Carbon Composition	1/2W	GK	56 Ω
R105	J10276221	" "	"	"	220 Ω
R103	J20336220	Metallic Film	2W		22 Ω
R102, 104	J20336221	" "	"		220 Ω
		POTENTIOMETER			
VR101	J51727101	CR19R	100 Ω		
VR102	J51729201	RV8 FAN	200 Ω		
VR103	J51729503	"	50k Ω		
		CAPACITOR			
C121	K00172010	Ceramic Disc	50WV	SL	1pF
		(DD104SL010C50V02)			
C101	K00172030	" "	"	"	3pF
		(DD104SL030C50V02)			
C115, 119	K00175470	" "	"	"	47pF
		(DD104SL470J50V02)			
C113, 114	K00175560	" "	"	"	56pF
		(DD104SL560J50V02)			
C116-118	K00175101	" "	"	"	100pF
		(DD105SL101J50V02)			
C105	K00179018	" "	"	"	160pF
		(DD106SL161J50V02)			
C131	K00175471	" "	"	"	470pF
		(DD109SL471J50V02)			
C104	K11179001	" "	"	"	0.001 μ F
		(ECK-D1H-102MD)			

PARTS LIST

MAIN CHASSIS			
Symbol No.	Part No.	Description	
TRANSISTOR			
Q1	G3319450	2SC1945	(MAIN UNIT)
DIODE			
D1	G2090034	Si U05B	
D2	G2090001	Si 10D1	(MAIN UNIT)
CAPACITOR			
C3	K00173080	Ceramic Disc 50WV SL	8pF
		(DD104SL080D50V02)	
C1, 2	K00179009	" " " "	43pF
		(DD104SL430J50V02)	
C4	K13170103	" " " "	0.01 μ F
		(DB201YF103Z5L5)	
INDUCTOR			
L1	L0021025		
SWITCH			
S1	N4090046	SUF12	
CONNECTOR			
J1, 2	P1090194	FM-MR-M2'	
J3	P0090093	XG9242	
J4	P0090244	FM214(2)-2S	
MAIN UNIT			
Symbol No.	Part No.	Description	
PB-2289	F0002289	Printed Circuit Board	
	C0228900	PCB with Components (with Q1, D2)	
IC			
Q102	G1090080	78L08	

BASE INSTALLATION

A power supply capable of supplying at least 5 amps at 13.8 volts DC is required for operation from the AC main. The Yaesu FP-80A AC power supply provides the required 13.8 volts DC for the FL-6010 and the FT-690R combination. For further details, see your Yaesu dealer.

MOBILE INSTALLATION

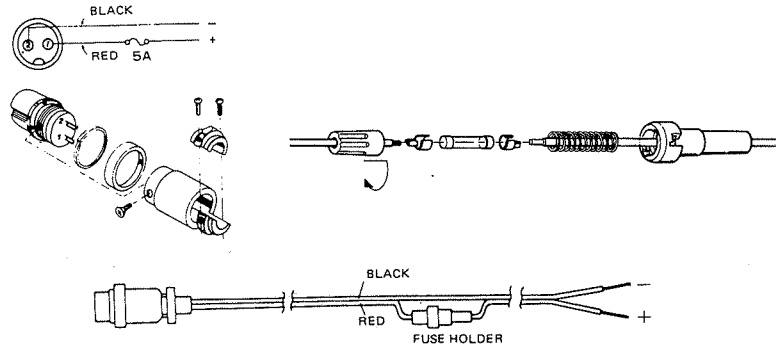
For mobile installation, a direct connection to the battery is best. If power connections are made at the ignition switch, unnecessary noise pick-up may occur. Also, if the power is taken from the automobile lighting, cigarette lighter or other circuits, the circuit line may suffer from unnecessary voltage drops, and as a result, the proper power rating will not be obtained.

The power connection procedure is detailed below. Once the power connections are made, but before the power cord is connected to the transceiver, you should check the battery charging voltage with the engine running fast enough for the car ammeter to show a charge. If the voltage exceeds 15 volts, the car voltage regulator must be adjusted to limit the maximum voltage to less than 15 volts. Also, when making power supply connections, you must be absolutely certain that the proper supply polarity is observed.



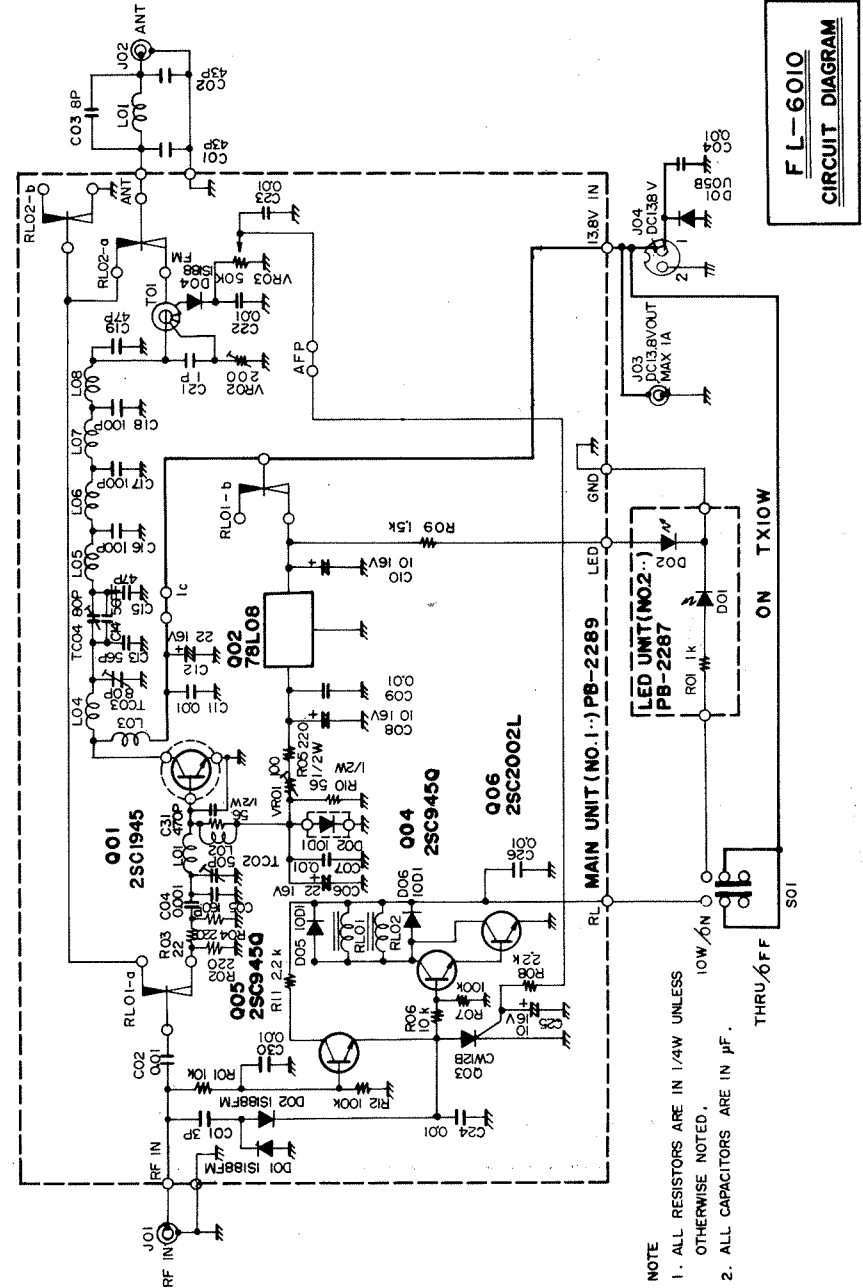
ANTENNA CONSIDERATION

The FL-6010 is designed for operation using an antenna presenting a 50 ohm resistive load. The automatic final transistor protector circuitry will cut off the linear amplifier to protect the transistor when a high antenna SWR is encountered. The SWR on the antenna should, if possible, be kept below 1.5:1 at all times, to secure full output from the linear amplifier.



Power cord connections

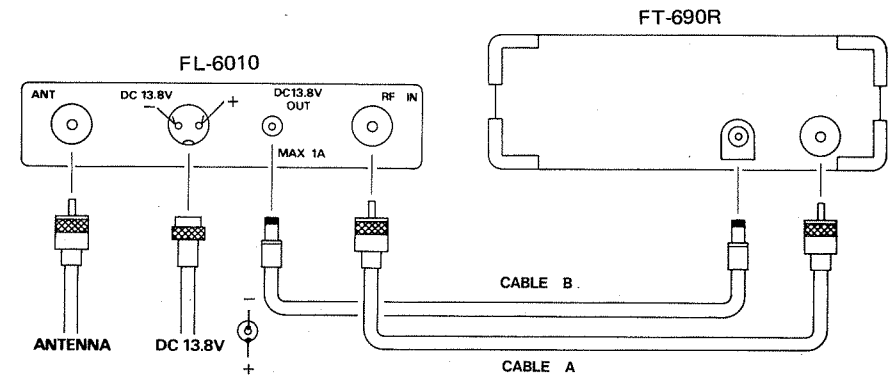
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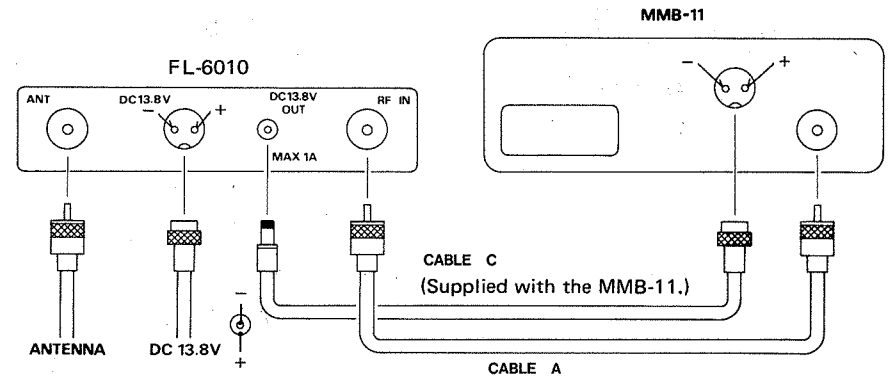
C. AFP Alignment

1. Disconnect the wire connected to the AFP terminal, and connect the + lead of a DC voltmeter to the AFP terminal. Connect the - lead to ground.
2. Preset VR₁₀₃ fully clockwise.
3. Set the transceiver to 52 MHz and the mode switch to FM. Now close the PTT switch and adjust VR₁₀₂ for minimum deflection on the voltmeter.
4. Connect the wire to the AFP terminal, as it was connected prior to Step 1.
5. Now remove the dummy load, and close the PTT switch. Adjust VR₁₀₃ to the point where the TX indicator just turns off. This alignment should be performed within 10 seconds, as alignment without a dummy load for longer than 10 seconds will cause damage to the final transistor.
6. If a 110 ohm dummy load is used (three parallel-connected 330 ohm resistors), connect it to the ANT jack. Now close the PTT switch so that the AFP circuit remains off. If the AFP circuit is activated, adjust VR₁₀₃ so that the AFP circuit remains off.

INTERCONNECTIONS



FL-6010/FT-690R



FL-6010/MMB-11/FT-690R

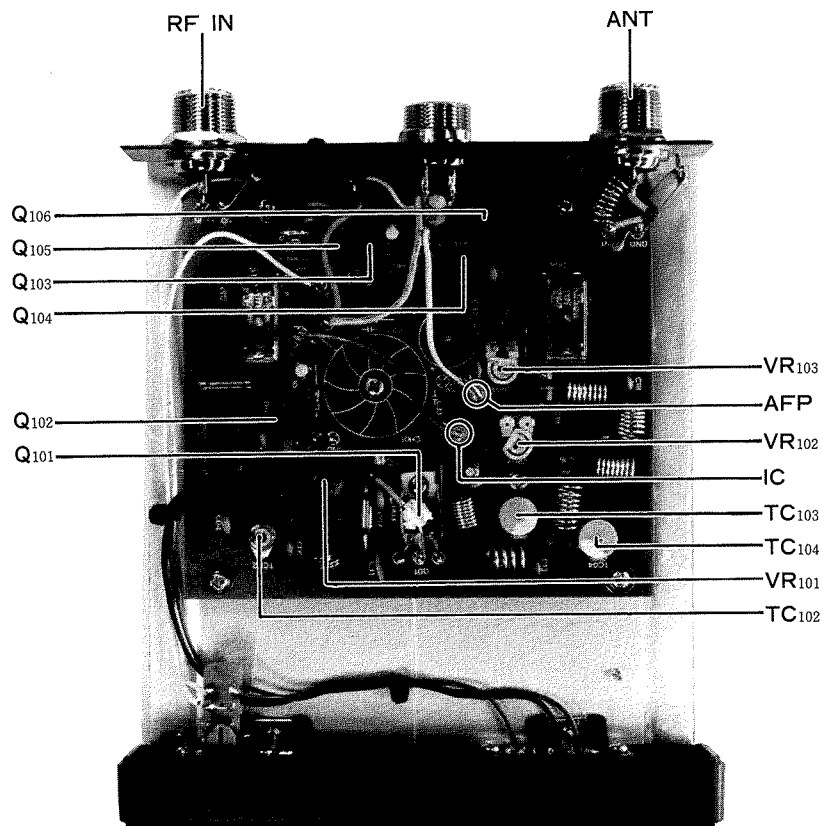
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MAINTENANCE AND ALIGNMENT

This equipment has been carefully aligned and tested at the factory prior to shipment. If the instrument is not abused it should not require other than the usual attention given to electronic equipment.

Service or replacement of a major component may require considerable realignment. Under no circumstances, though, should realignment be attempted unless the operation of the equipment is fully understood, the malfunction has been carefully analyzed, and the fault has definitely been traced to misalignment rather than part failure. Service work must only be performed by experienced personnel using the proper test equipment.

Never align this linear amplifier without having a 50 ohm dummy load connected to the antenna jack, unless otherwise noted.



A. Base Current Adjustment

1. Disconnect the wire connected to the IC terminal on the printed circuit board, and install a 250mA full scale DC ammeter between these points.
2. Set the transceiver to the SSB mode, and close the PTT switch without applying a tone to the microphone. Adjust VR₁₀₁ so that the ammeter shows 150mA.
3. Now release the PTT switch and connect the wire to the IC terminal.

B. Matching Networks Alignment

1. Connect a dummy load/wattmeter to the ANT jack of the FL-6010.
2. Set the transceiver to 52.00 MHz, and the mode switch to FM. Now close the PTT switch and adjust TC₁₀₂ through TC₁₀₄ for a maximum RF reading on the wattmeter.