

Harry Leeming, G3LLL,

gives simplified alignment details.

HAM RADIO TODAY FEBRUARY 1984

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FT101 ALIGNMENT

Correct alignment makes the difference between mediocre and superb performance with the best equipment, and the FT101 is no exception. Alignment details are given in Yaesu's manual but experience has shown that the full procedure is only necessary if the alignment has been interfered with. In general it is advised that coil cores should be left alone unless there is clear evidence that they have need of adjustment. First, a couple of faults that come under the heading of 'alignment'.

PA and Driver oscillates or exhibits poor neutralization on the 40m band only FT101 MK2 — E. This is caused by misalignment of the extra coil L33 which is switched in on 40m to improve rejection of the transmit 'I.F.'. To cure, melt the wax holding L33 core with a hot iron and then trim until good transmit drive is obtained together with stability. The core is very easy to damage and difficult to obtain so use the correct trimming tool and *do not force it*.

'S' meter does not fall to zero. This effect sometimes only occurs on one side band, and is caused by RF from the BFO getting into the AGC system. To cure, carefully adjust the balance pot VR1 in the product detector circuit on the low frequency IF board until the reading disappears. Note that if VR1 is badly out of alignment the receiver will be almost dead with the S meter reading S9 + .

Location Of Adjustments

Yaesu have not done a particularly good job of indenting the various adjustments in the FT101 users manual (perhaps to discourage unnecessary fiddling!). The alignment and adjustment location chart published by the FT Club and printed by their permission as Figs.D and E helps no end, but please only adjust if you really know what you are doing, unless of course you wish to pay me £10 an hour to sort out the mess!

Simplified Alignment

If you are reasonably competent, and your rig is not badly out of alignment the following adjustment procedure is quite simple to follow through, and will normally considerably improve performance on the older rigs which have drifted a little. *Do not force trimmers if they are stiff.* Try warming *slightly* with an iron but watch you don't melt the solder.

160-15 Metres

(1) . . . Tune to calibration point in centre of band and peak pre-selector for maximum on receive. (2) . . . Leave pre-selector set, switch to transmit, set carrier control to give about 70ma and tune load and PA for maximum RF output. (3) . . . Trim driver anode tuning capacitor on band in use (TC6-TC10) for maximum RF power out reducing drive control if PA current exceeds 100MA. Repeat above once or twice until pre-selector peaks on receive at same point as on transmit. *Compromise for MAX TX drive if necessary.* Note Some makes of 12BY7A will make Tx & Rx peaks differ.

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10 Metres

(1) . . . Tune to 28.6MHz (or wherever in the 10m band peak performance is required), and tune pre-selector for maximum on receive.

(2) . . . Switch to transmit and with a small amount of carrier inserted, tune PA and load and *retune* pre-selector for maximum RF power output, noting as to whether it is necessary to tune pre-selector HF or LF. (3) . . .

Set pre-selector half-way between points of peak performance on receive and transmit, and trim grid capacitor TC5 for maximum RF output, reducing drive if PA current exceeds 100ma. Repeat 1-3 a few times until points of peak performance in transmit and receive coincide. Compromise for MAX TX drive if necessary. Note. Some makes of 12BY7A will make Tx & Rx peaks differ.

If desired, the aerial trimmer capacitors can be set on signal for maximum receive strength, but this is seldom needed, likewise, rarely will it be necessary to interfere with the coil settings.

Local Oscillator Trimmers If set suddenly goes dead on one band (usually 15 metres), slightly adjust oscillator trimmer until unit comes to life. Set trimmers for maximum Rx gain, but not too near point where oscillation ceases.

Band Pass Filter Adjustment — All Modes It is important that the band pass filter be correctly aligned. If it has been altered or if new boards have been fitted, it is important that filter be checked. Proceed as follows: Set transmitter for output on 14MHz into a 50 ohm dummy load. In TUNE position at 14000 KHz adjust PRE-SELECTOR, PLATE and LOADING for maximum power output. *Do NOT exceed IC reading of 200mA.* Adjust carrier control for 200mA. Use transmit mode for minimum time necessary to adjust controls (five seconds at intervals of 10-15 secs). Do not touch CARRIER control after setting. Adjust PRE-SELECTOR PLATE and LOADING for maximum output at 14250 KHz, note IC meter reading. Repeat at 14500 KHz. If readings are much different at these frequencies, 14000, 14250, and 14500 KHz, then alignment of band-pass is required.

In TUNE position at 14000 KHz adjust PRE-SELECTOR, PLATE and LOADING for maximum output with IC reading of 100mA. Adjust TC3 for maximum. Repeat at 14500 KHz, but adjust TC1 for maximum output. Repeat both at 14000 and 14500 KHz as adjustments will interact. Now check that maximum output at 14000 KHz and 14500 KHz are the same, If not, adjust TC2 as follows: If output is lower at 14500 KHz, increase TC2, if lower at 14000 KHz decrease TC2. After adjustment of TC2 repeat adjustments of TC1 and TC3, then re-check output.

Receive Band Pass Filter. Peak TC5 and TC4 for best signal using internal crystal calibrator of FT101.

Do not play around with trimmers needlessly, especially if you do not understand their functions completely. Full alignment is quite a major operation [and rarely required] but if you are reasonably competent you should be able to "peak up" your set quite safely as follows:

All Bands [160 - 15 meters Inclusive]

1. Tune to a calibration point in the center of the band and peak the Preselector for maximum S meter reading on Receive.
2. Leave Preselector set, switch to Transmit, set carrier control to give IC of about 70mA, and tune Load and Plate Controls for maximum RF Output [Mode Selector in TUNE position, of course].
3. Trim driver anode tuning capacitor for Band in use (TC6 thru 10 - see left) for maximum RF power output reducing Carrier control to keep IC below 100mA. Repeat above once or twice until Preselector peaks at same point for both Receive and Transmit.

Note: It is desirable to use a separate meter [like a SWR or RF Wattmeter] to indicate relative or actual forward Power Output, so IC can be monitored and kept at or below 100mA on Transmit. At this current there is no strain on the finals so work can be done slowly and carefully. A dummy load must be used during Alignment.

10 Meter Band

1. Using the internal calibrating signal, tune receiver to 28.6MHz (or wherever peak performance is desired) and tune the Preselector for maximum S meter deflection. Mode switch in TUNE position.
2. Switch to Transmit (into dummy load) and, with a small amount of Carrier inserted, tune the Plate and Load controls and re-tune the Preselector for maximum RF power output. Note whether it is necessary to tune the Preselector towards higher or lower frequency.
3. Set Preselector half-way between points of peak performance on Receive and Transmit, and trim grid capacitor TC5 for maximum RF output, reducing carrier level if required to keep IC below 100mA. Repeat steps 1 - 3 a few times until peak performance on TX and RX coincide.

Note: If desired, the Antenna trimmer capacitors [TC-11 thru 15] may be set on signal for maximum S meter reading but this is seldom needed. Likewise adjustment of the slug positions is rarely required.

Local Oscillator Trimmers

If the set suddenly goes dead on one band (usually 15 meters) or does not "start up" when cold, slightly adjust [tweak] the Oscillator Trimmer [TC-19 for 15 meters] until the set comes to life. Set trimmer for maximum RX gain but not too near the point where oscillation ceases. [The Manual refers to the Oscillator as the Heterodyne Crystal Oscillator.]

Band-Pass Filter Adjustment [All models]

It is important that this filter be correctly adjusted. While it is most unlikely to require any work if not tampered with, it should be checked if it has been altered or if new circuit boards have been installed. Space does not permit inclusion of details of procedure here: See September 1975 issue of FT NEWSLETTER.

Above, for most part, from Harry Leeming G3LLL

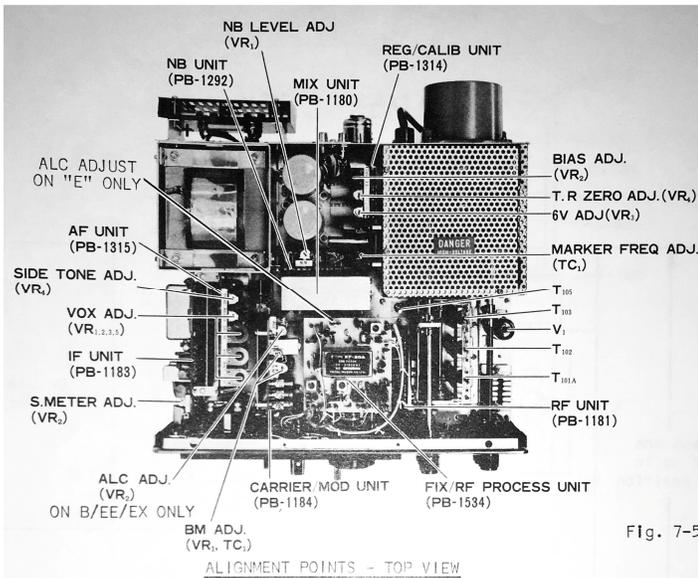


Fig. 7-5

ALIGNMENT POINTS - TOP VIEW

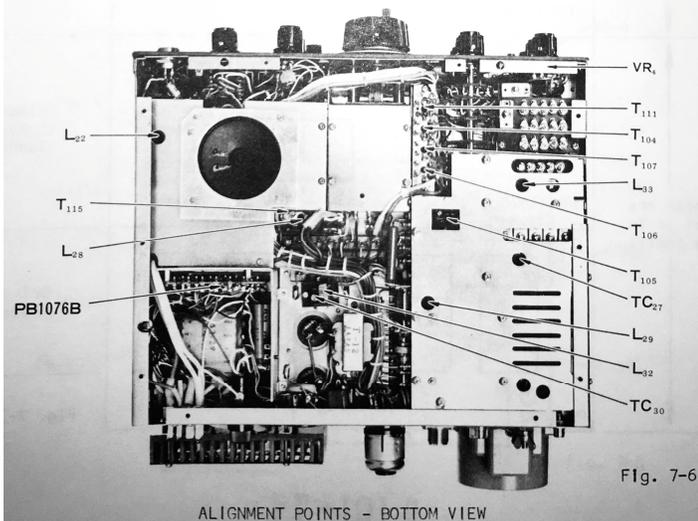


Fig. 7-6

ALIGNMENT POINTS - BOTTOM VIEW

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

A
B
C
D
E
F
G
H
I
J
K

YAESU FT-101

Transceiver

ALL MODELS
[Mark I, II; B & E]

POWER TRANSFORMER

[RECTIFIER UNIT - PB-1076 Below]

B & E Only: NOISE BLANKER
PB-1292 [See Note 4]

REAR

VR-6 PO ADJUST
ON REAR APRON

POWER RE
B 1314;

RL-2
ANT Relay
[Below]

1. Mark I applies 24000; Mark II FT-101E in June
2. Unless otherwise circuit boards far as is known
3. With few except same in all FT-
4. The Noise Blanker type board. The mounted above t board also cont the board in th B; the mark II above the VFO; was part of the
5. Adjustment conti will generally l where functions various Noise B originally draw 128367 - note th It was subsequer other series of

IC BIAS
50 MA VR (2)

TRANSMIT
ZERO SET VR (4)

VOLTAGE REG VR
ADJUST FOR +6V
BETWEEN PIN 13
AND GND. (3)

TRAP FOR SPURIOUS
ON 10 METERS TC
100 KHz
XTAL CALIB
TC-1

RL-1
SWITCHING
RELAY

PB 30
1166

HI-FREQ IF [Shielded]
PB1082/1180;
Mk I 1082/1084

T-112A (4) TC (5)

T 113

TRAP FOR SPURIOUS ON 20M (3) SEE NL 9/75 (1)

80-METER
ALIGN T

LOW FREQ IF PB-1183
Mk I: 1080-See Note 4.

S-METER
ADJ VR (2)

CW SIDE TONE
LEVEL ADJUST
VR (4)

VOX RELAY
SENSITIVITY
VR (3)

VOX RELEASE
DELAY TIME
VR (2)

VOX (1)

ANT TRIP
VR (5)

VR* (7)

VOX RELAY
SENSITIVITY

VOX SENSITIVITY

ALC (2) VR

T110 (1) TC

BM (1) VR

AM (4) TC

LSB (3) TC

USB (2) TC

ALC ADJUST TO .5

CARRIER BALANCE

T118 (1) VR - NOISE BLANKER

CARRIER BALANCE

PREVENT SPEAKER
TRIPPING-VOX

CARRIER OSC
XTAL TRIMMERS

CH 2

CH 1

XTAL SOCKETS

TEST POINT FOR
RETRO XTAL OSC
ALIGN 0.3V RMS

FRONT

AUDIO UNIT: B PB-1315
Mk II 1189; Mk I 1081

MODULATOR PB-1184
Mk I 1078

NB &/or XTAL CONT &/or
PROCESS (see Note 4). Mk I
1070; Mk II 1182; B 1344;
E 1494 [incl. PROCESS].

HF
Mk

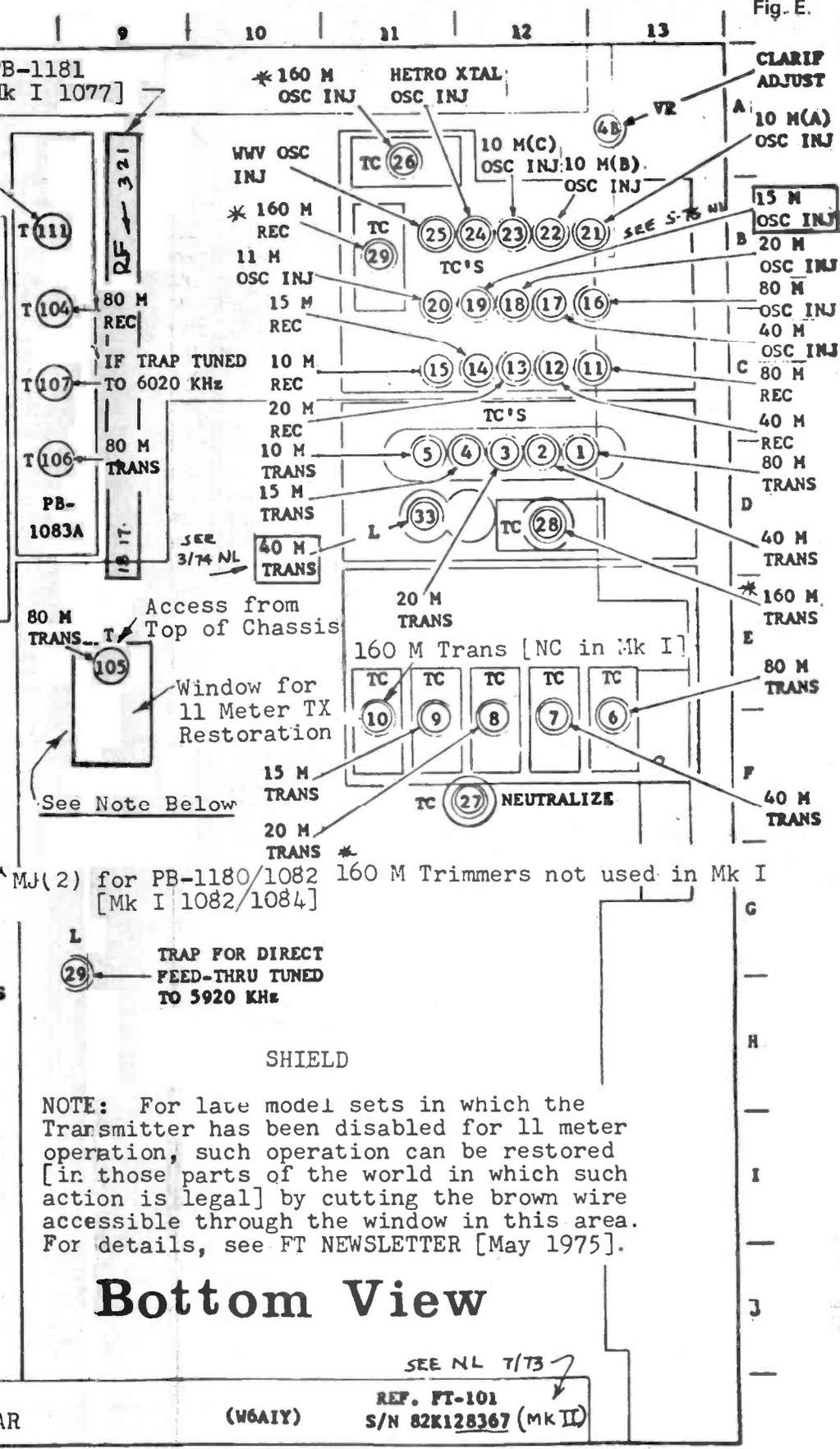
* VR-7 [Mk I Only] Sets Mic Control Range

For grea

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Fig. E.

This service and alignment control layout is reprinted courtesy of the International Fox-Tango Club and Mily Lowens, N4ML.

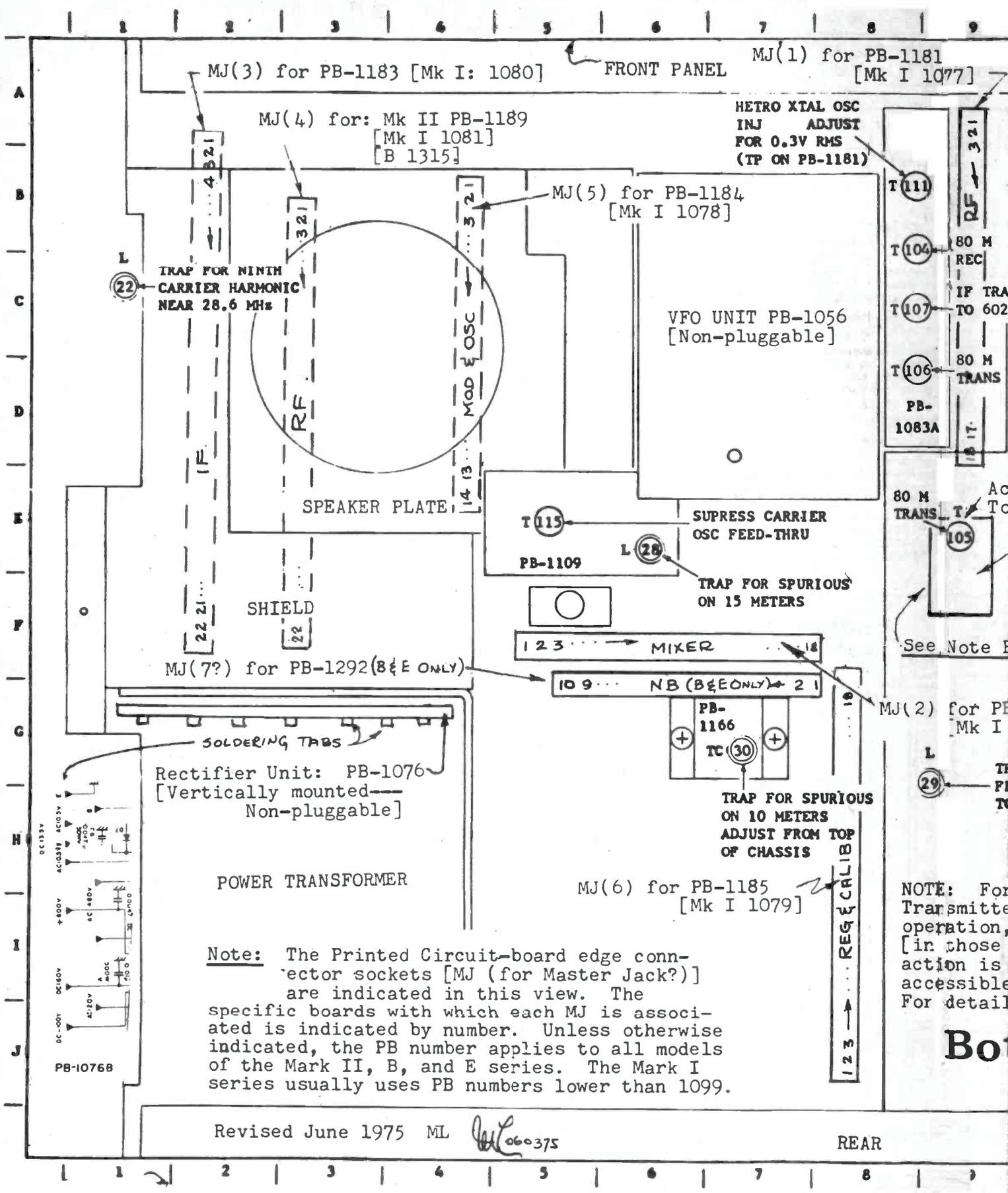


MJ(2) for PB-1180/1082 [Mk I 1082/1084] 160 M Trimmers not used in Mk I

NOTE: For late model sets in which the Transmitter has been disabled for 11 meter operation, such operation can be restored [in those parts of the world in which such action is legal] by cutting the brown wire accessible through the window in this area. For details, see FT NEWSLETTER [May 1975].

Bottom View

For greater convenience in use, pull out this page.



Note: The Printed Circuit-board edge connector sockets [MJ (for Master Jack?)] are indicated in this view. The specific boards with which each MJ is associated is indicated by number. Unless otherwise indicated, the PB number applies to all models of the Mark II, B, and E series. The Mark I series usually uses PB numbers lower than 1099.

NOTE: For Transmitter operation, [in those action is accessible For detail

Bo

Revised June 1975 ML *ML* 060375

REAR

POWER REG UNIT: PB-1185,
B 1314; Mk I 1079

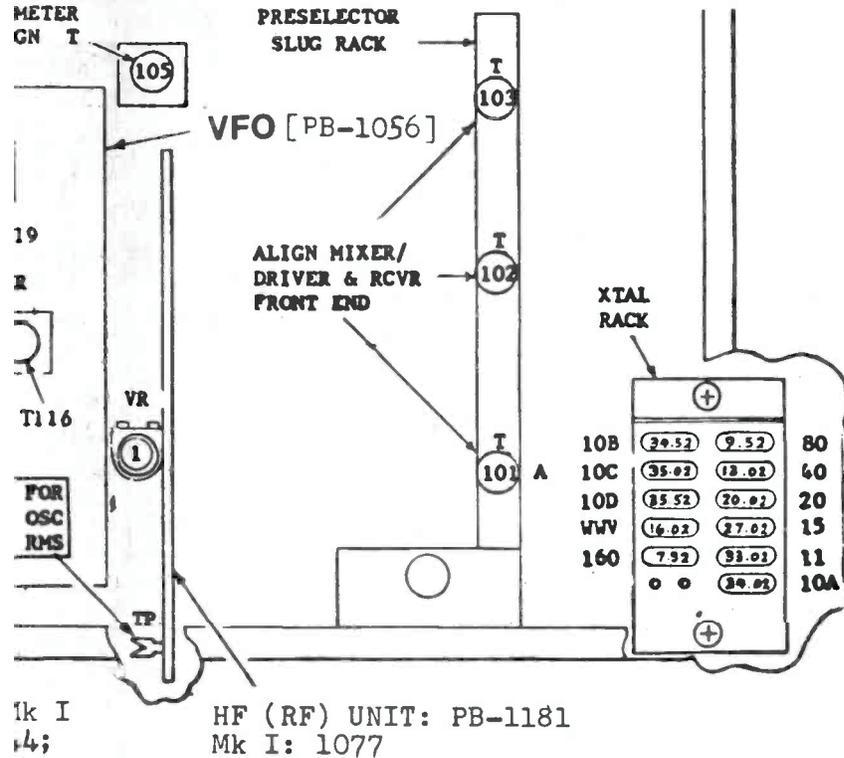
RL-2
ANT Relay
[Below]

NOTES

1. Mar. I applies generally to Serial Numbers below 24000; Mark II above 25000, B to introduction of FT-101E in June 1975, E to date. [see NL 7/75]
2. Unless otherwise indicated, PB numbers apply to circuit boards in both Mark II and B series [as far as is known, E also]. Mark I numbers are given.
3. With few exceptions, alignment controls are the same in all FT-101s, early and late.
4. The Noise Blanker in the B and E series is a plug-type board. The separate crystal control board is mounted above the VFO box in the B; in the E, this board also contains the RF Processor unit. The board in the Mark I was similar to that in the B; the mark II board included the Noise Blanker above the VFO; in the Mark I, the Noise Blanker was part of the Low Frequency IF Unit.
5. Adjustment controls on individual circuit boards will generally be the same for all series except where functions are clearly different (as in the various Noise Blanker boards). The diagram was originally drawn for the FT-101 Mark II (S/N 82K-128367 - note that only the last five digits apply). It was subsequently adapted for use with the other series of FT-101s.

Top View

FINAL AMPLIFIER CAGE



Service & Alignment Control Layout

Designed and Drawn by
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Edited and Adapted by
Milton Lowens WA2AOQ

Published by the



Adjustment of Slugs, Trimmers, Pots, etc.

Slugs. These are adjusted by inserting the plastic trimmer tool into the hexagonal hole and rotating the tool. First, however, the wax used at the factory to lock the slug must be softened by carefully inserting a short length of heated bare No. 14 wire into the hole for a minute or two. To heat the wire, wrap one end around the tip of a small soldering iron. Slugs should turn easily—do not use force! The wax will lock the slug again as it cools.

Ceramic Trimmers. These are locked with unthinned enamel paint. The trimmers are mechanically delicate and easily broken. Use a tool that fits the screw slot well to avoid undue pressure; make adjustments slowly and gently. Usually very little angular rotation is required and the exact position for peaking requires much care.

Can Cores. These are like the ones used in the Preselector assembly: they have a thin threaded brass rod sticking out of the top. They are difficult to adjust except with jewelers tools because the slot in them is so narrow. Also the material used to lock the rods is quite tough—use a solvent like nail-polish remover—some recommend removing the entire assembly of 3 cores while removing the locking material. Use rubber cement after adjustments for locking. If slotted end of rod breaks, force a small brass nut on it and solder it in place—then use a suitable tool.

Circuit Board Potentiometers. These are quite rugged but a properly fitting screwdriver is recommended to avoid the need for undue pressure.

Small IF-type cans. If the hole is full of wax, use the same technique described above for slugs.

ALIGNMENT: See back of this page.

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