

SUBJECT: *Part Change (pre-drive, drive transistor) and New PCB Information*

This is information to announce some part changes and PCB update on TS-2000 series.

- Pre-drive and drive transistor substitution due to discontinuation of the part.
- Relay part substitution due to discontinuation of the part.
- PC board circuit change, part changes, and some layout changes on final unit X45-360 for new pre-drive/drive.
- Some part changes on TX-RX unit X57-605 and filter unit X51-312 to suit to new pre-drive/drive transistors.

TS-2000/2000X/B2000 FINAL UNIT X45-360X-XX				
	Status	OLD PCB Rev: J79-0110-09	NEW PCB Rev: J79-0110-19/29	Remark
Q2	Transistor (Pre-Drive)	2SC1971 (non-RoHS) 2SC1971-101 (RoHS)	RD06HHF1-102 (RoHS)	Not compatible
Q3, Q4	Transistor (Drive)	2SC1972-26 (non-RoHS) 2SC1971-126 (RoHS)	RD16HHF1-102 (RoHS)	Not compatible

You can check PCB revision with a silk-screened indication on the PC board.

Please refer to page 4 about the other part changes.

IMPORTANT NOTICE

1. New pre-drive FET **RD06HHF1-102** and new drive FET **RD16HHF1-102** are NOT available to use with older revision final unit (J79-0110-09).
2. Old pre-drive transistors **2SC1971** and **2SC1971-101**, old drive transistors **2SC1972-26** and **2SC1972-126** are NOT available to use with newer revision final unit (J79-0110-19 or higher).
3. If you replace final unit with new revision PC board (J79-0110-19 or higher), some parts on both TX-RX unit X57-605 and filter unit X51-312 need to be converted to NEW condition.
4. If you replace drive transistor **RD16HHF1-102** on the new final unit, some additional modifications are required depending on the revision of PC board. Please refer to page 2 about the detail.
5. The final idling current adjustment (HF/VHF) for new final unit is different from original procedure indicated in the service manual. Please refer to page 3 about the detail.

SERIAL RANGE

New pre-drive/drive transistors and new PC have been applied from S/N 90300001 onwards.

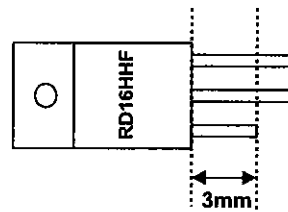
<NOTICE FOR REPLACING DRIVE TRANSISTOR>

At first please check the revision of PC board. When you replace drive transistors RD16HHF1-102 on the new final unit, some additional modifications are required depending on the PC board revision.

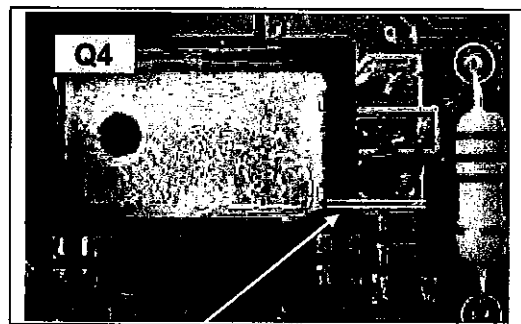
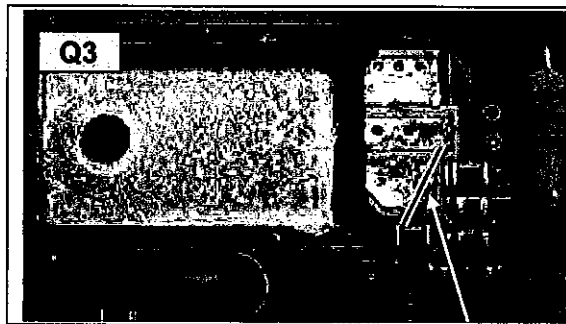
PC board Revision	J79-0110-09	J79-0110-19	J79-0110-29
Serial Number Range	S/N 902xxxxx and lower	K: S/N 90300001~90400150 E: S/N 90300001~90400070	K: S/N 90400151 onwards E: S/N 90500001 onwards
Pre-Drive	2SC1971 (non-RoHS) 2SC1971-101 (RoHS)	RD06HHF1-102 (RoHS)	RD06HHF1-102 (RoHS)
Drive	2SC1972-26 (non-RoHS) 2SC1971-126 (RoHS)	RD16HHF1-102 (RoHS)	RD16HHF1-102 (RoHS)
When you replace drive transistor	New drive transistor RD06HHF1-102 is NOT available on this PC board revision.	Additional modification is required.	Any additional modification is NOT required.

On the newer final units J79-0110-19 onwards, 1 ohm resistor RK73RB2E1R0J is added in series to RD16HHF1-102 gate terminal. However, only on the PC board J79-0110-19, the solder pad for this 1 ohm resistor is not available. If you need to replace drive transistor RD16HHF1-102 on the PC board J79-0110-19, the following modification is required to add 1 ohm resistors.

1. Cut only the gate terminal in 3mm length

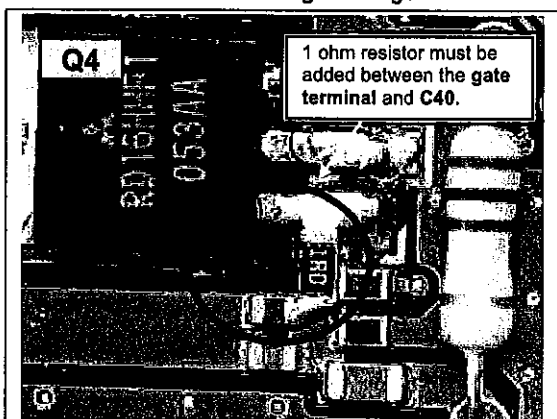
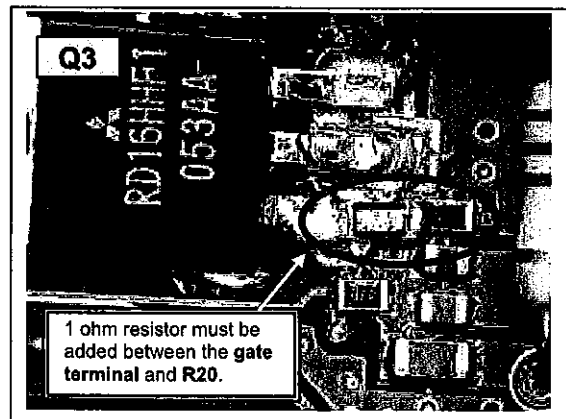


2. Remove the defective drive transistor from PC board.



The solder pads for gate terminal have already been cut at the factory.

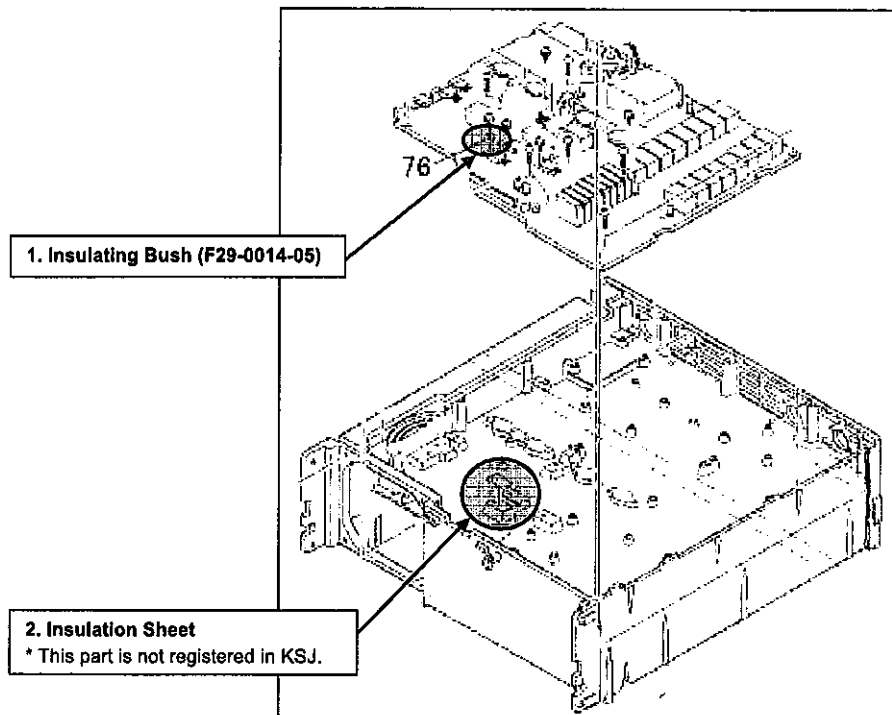
3. Mount drive transistor RD16HHF1-102 and 1 ohm resistor RK73EB2E1R0J as following drawings.



<NOTICE FOR REPLACING FINAL UNIT X45-360>

If you replace Final Unit X45-360 with newer revision PC board (J79-0110-19 or higher), 2 parts need to be removed away. One is the insulating bush **F29-0014-05** (Ref No. 76) applied to the screw for pre-drive. Another is the insulation sheet stuck to pre-drive (Q2) area of the chassis. These 2 parts are required **ONLY** for older pre-drive transistor **2SC1971-101**.

After removing the insulation sheet, please apply silicon grease between **RD06HHF1-102** and chassis.



<ADJUSTMENT>

Only the final idling current adjustment (HF/VHF) for new final unit is different from the original procedure indicated in the service manual. If you repair the new final unit, please apply the following procedure.

* The other adjustment items are completely same as the original procedures.

Total 4 volumes to adjust final idle current are available on the new final unit. Please check the location in the PC board view (page 8 in this STR). The volumes on the PC board view are highlighted in red color.

Item	Condition	Measurement				Adjustment		Spec
1. Final Idling current (HF/VHF)	1) Display f.: 14.100MHz Mode: USB Final Unit (A/2) VR1, 2, 3, 4: MIN Transmit	DC. A	Rear panel	DC	Final (A/2)		Check the default current (I_o)	$\pm 20\text{mA}$
						VR4	$I_o + 500\text{mA} = I_A$	
						VR2	$I_A + 500\text{mA} = I_D$	
						VR3	$I_D + 500\text{mA} = I_E$	
						VR1	$I_E + 500\text{mA}$	
	2) Display f.: 145.900MHz Mode: USB VR102: MIN Transmit					VR102	$I_o + 1000\text{mA}$	

IMPORTANT

Please adjust in the sequence of VR4, VR2, VR3, and VR1 at the end. Incorrect adjustment sequence might cause abnormal oscillation of drive transistor.

Modified Component List for TS-2000/2000X/B2000

Status	REF	OLD Part Number PCB: J72-0653-21		NEW Part Number PCB: J72-1001-09		Remarks
TS-2000/2000X/B2000						
Delete	76	F29-0014-05	INSULATING BUSH	#N/A		for Pre-Drive Q2
Delete	---	G10-1363-04	FIBROUS SHEET	#N/A		STR B540-06-014E
FINAL UNIT (X45-360X-XX) 0-11: K Type, 2-71: E Type						
Change	C4	CK73FB1H103K	CHIP C 0.010UF	CC73FCH1H470J	CHIP C 47PF	
Add	C18	#N/A		CK73FB1C105K	CHIP C 1.0UF	
Add	C19	#N/A		CK73FB1C105K	CHIP C 1.0UF	
Change	C20	CC73FCH1H331J	CHIP C 330PF	CK73FB1C105K	CHIP C 1.0UF	
Change	C36	CK73FB1C105K	CHIP C 1.0UF	CK73FB1E104K	CHIP C 0.10UF	
Change	C40	CK73FB1C105K	CHIP C 1.0UF	CK73FB1H102K		
Delete	C43	CK73FB1H103K	CHIP C 0.010UF	#N/A		
Change	C47	CM73F2H271J	CHIP C 270PF	CM73F2H391J	CHIP C 390PF	
Change	C49	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C50	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C51	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C52	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C53	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C54	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C55	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Change	C56	C93-0608-05	CHIP C 2700PF	C93-0716-05	CHIP C 3300PF	
Add	C75	#N/A		CK73FB1E104K	CHIP C 0.10UF	
Add	C76	#N/A		CK73FB1H102K	CHIP C 1000PF	
Add	C77	#N/A		CK73FB1E104K	CHIP C 0.10UF	
Add	C78	#N/A		CK73FB1H102K	CHIP C 1000PF	
Delete	C253	CD04AZ1V101M	ELECTRO 100UF 35WV	#N/A		
Delete	C254	CD04AZ1V101M	ELECTRO 100UF 35WV	#N/A		
Delete	C274	CK73FB1H103K	CHIP C 0.010UF	#N/A		
Change	TC101	C05-0309-05	CERAMIC TRIMMER CAP. (40P)	C05-0605-05	CERAMIC TRIMMER CAP. (50P)	
Change	TC102	C05-0309-05	CERAMIC TRIMMER CAP. (40P)	C05-0605-05	CERAMIC TRIMMER CAP. (50P)	
Change	TC901	C05-0030-15	CERAMIC TRIMMER CAP. (20P)	C05-0603-05	CERAMIC TRIMMER CAP. (20P)	
Delete	CN12	E23-1310-05	TEST TERMINAL	#N/A		
Change	L7	L39-1452-05	TOROIDAL COIL	L39-1518-05	TOROIDAL COIL	
Delete	L8	L92-0131-05	FERRITE CHIP	#N/A		
Delete	L9	L33-0699-05	CHOKE COIL	#N/A		
Delete	L211	L92-0131-05	FERRITE CHIP	#N/A		
Change	R2	RK73FB2B101J	CHIP R 100	RK73FB2B220J	CHIP R 22	
Change	R11	RK73FB2B221J	CHIP R 220	RK73FB2B472J	CHIP R 4.7K	
Change	R12	RK73FB2B391J	CHIP R 390	RK73FB2B560J	CHIP R 56	
Change	R13	RK73FB2B471J	CHIP R 470	RK73FB2B332J	CHIP R 3.3K	
Delete	R14	RK73RB2H2R2J	CHIP R 2.2	#N/A		
Change	R16	RK73FB2B1R0J	CHIP R 1.0	RK73FB2B101J	CHIP R 100	
Change	R17	RK73FB2B1R0J	CHIP R 1.0	RK73FB2B101J	CHIP R 100	
Change	R18	RK73FB2B1R0J	CHIP R 1.0	RK73FB2B102J	CHIP R 1.0K	
Change	R19	RK73FB2B1R0J	CHIP R 1.0	RK73FB2B102J	CHIP R 1.0K	
Change	R20	RK73FB2B101J	CHIP R 100	RK73FB2B472J	CHIP R 4.7K	
Change	R21	RK73FB2B101J	CHIP R 100	RK73FB2B472J	CHIP R 4.7K	
Add	R22	#N/A		RK73FB2B101J	CHIP R 100	
Add	R23	#N/A		RK73FB2B101J	CHIP R 100	
Change	R25	RK73FB2B820J	CHIP R 82	RK73FB2B102J	CHIP R 1.0K	
Delete	R26	RK73FB2B270J	CHIP R 27	#N/A		
Change	R45	RS14DB3D390J	FL-PROOF RS 39	RS14DB3A101J	FL-PROOF RS 100	
Change	R46	RS14DB3D390J	FL-PROOF RS 39	RS14DB3A101J	FL-PROOF RS 100	
Change	R202	R92-2536-05	CHIP R 2.2	RK73PB2H2R2J	CHIP R 2.2	Only K Type
Delete	R214	RK73EB2E000J	CHIP R 0	#N/A		
Delete	R223	RK73FB2B181J	CHIP R 180	#N/A		
Delete	R224	RK73FB2B680J	CHIP R 68	#N/A		
Delete	R225	RK73FB2B332J	CHIP R 3.3K	#N/A		
Delete	R226	RK73FB2B103J	CHIP R 10K	#N/A		
Delete	R227	RK73FB2B122J	CHIP R 1.2K	#N/A		
Delete	R228	RK73FB2B270J	CHIP R 27	#N/A		
Add	R503	#N/A		RK73EB2E1R0J	CHIP R 1.0	Refer to page 2
Add	R504	#N/A		RK73EB2E1R0J	CHIP R 1.0	Refer to page 2
Change	VR1	R12-6730-05	TRIMMING POT. (220)	R12-6740-05	TRIMMING POT. (10K)	
Add	VR3	#N/A		R12-6740-05	TRIMMING POT. (10K)	
Add	VR4	#N/A		R12-6740-05	TRIMMING POT. (10K)	
Change	K801	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K802	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K804	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K805	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size

Modified Component List for TS-2000/2000X/B2000

Status	REF	OLD Part Number PCB: J72-0653-21		NEW Part Number PCB: J72-1001-09		Remarks
Change	K807	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K808	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K810	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K811	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K813	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K814	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K816	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K817	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K819	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K820	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K822	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Change	K823	S76-0419-25	RELAY	S76-0460-05	RELAY	Different Size
Delete	D2	MA2C029WBF	VARISTOR	#N/A		
Delete	D3	1SS355	DIODE	#N/A		
Delete	D211	02CZ12(Z)F	ZENER DIODE	#N/A		
Change	Q2	2SC1971-101	TRANSISTOR (RoHS)	RD06HHF1-102	TRANSISTOR (RoHS)	E Type, Not compatible
Change	Q2	2SC1971	TRANSISTOR (non-RoHS)	RD06HHF1-102	TRANSISTOR (RoHS)	K Type, Not compatible
Change	Q3	2SC1972-126	TRANSISTOR (RoHS)	RD16HHF1-102	TRANSISTOR (RoHS)	E Type, Not compatible
Change	Q3	2SC1972-26	TRANSISTOR (non-RoHS)	RD16HHF1-102	TRANSISTOR (RoHS)	K Type, Not compatible
Change	Q4	2SC1972-126	TRANSISTOR (RoHS)	RD16HHF1-102	TRANSISTOR (RoHS)	E Type, Not compatible
Change	Q4	2SC1972-26	TRANSISTOR (non-RoHS)	RD16HHF1-102	TRANSISTOR (RoHS)	K Type, Not compatible
Delete	Q211	DTB143EK	DIGITAL TRANSISTOR	#N/A		Only K Type
Delete	Q218	2SC2412K(R)	TRANSISTOR	#N/A		
Delete	TH101	157-501-55003	THERMISTOR	#N/A		
Delete	TH102	157-501-55003	THERMISTOR	#N/A		
FILTER UNIT (X51-315X-XX) 0-11: K Type, 2-71: E Type (*1)						
Change	C252	C93-0573-05	CHIP C 120PF	C93-0568-05	CHIP C 47PF	
Add	C254	#N/A		C93-0573-05	CHIP C 120PF	
Change	C261	C93-0565-05	CHIP C 27PF	C93-0568-05	CHIP C 47PF	
Change	C302	C93-0572-05	CHIP C 100PF	C93-0570-05	CHIP C 68PF	
Change	C303	CM73F2H471J	CHIP C 470PF	CM73F2H331J	CHIP C 330PF	
Delete	C308	CM73F2H271J	CHIP C 270PF	#N/A		
TX-RX 1 UNIT (X57-605X-XX) 0-11: K Type, 2-71: E Type (*1)						
Change	D113	02DZ2.5F-Y	ZENER DIODE	02DZ5.6F-Y	ZENER DIODE	

*1 ... If you replace Final Unit with new revision PC board, 6 parts on Filter Unit and 1 part on TX-RX1 Unit need to be converted