RS-5 (RSK-253) receiver (top) and RS-5 (SMT-1) transmitter (below). Both are low band Type A version, covering 3-7MHz in a single range. Note the modification of the enclosure, a partition created to store the accessories.

RS-5 (RSK-253 and SMT-1)

Country of origin: USA/Japan.

By Pete McCollum and Louis Meulstee.

Pete McCollum (co-author of WftW Volume 4) finally solved the mystery surrounding the organisation, development, and production of a shortwave radio station comprising the SMT-1 transmitter and RSK-253 receiver, along with its associated AC mains power unit. In earlier publications over the years, the station was frequently referred to as a 'small radio of unknown origin' and a 'mysterious small radio device.'

DATA SUMMARY

Organisation: CIA.

Design: Specifications CIA lab.

Manufacturer: Unknown Japanese.

Year of introduction: 1952.

Purpose: Intended as a temporarily substitute of the RS-1.

Transmitter: SMT-1

Circuit features: Crystal controlled oscillator and RF output valve. Morse CW only.

Frequency coverage: Type A 3.5-7MHz and Type B 7-16MHz.

Valves: 6J5 and 6L6.

Receiver: RSK-253

Circuit features: RF stage, mixer/oscillator, IF, AF and BFO. IF 455 kHz. No AVC; Morse CW only.

Frequency coverage: Type A 3.5-7MHz and type B 7-16MHz.

Valves: 1T4 3x, 1R5, 1S5.

Power Supply unit: Input 80-220V AC 50-60Hz.
Receiver: 1½V DC LT and 90V DC HT.
Transmitter: 6.3V AC LT and 400V DC HT.

Size (cm):	height	length	width
Transmitter / Receiver	13.5	165	210
Mains power supply	16	190	270 (an estimate)

Accessories: Carried in a partition of the receiver and transmitter box: Receiver dial calibration card, Morse key, transmitter tuning card, headphones, aerial and earth lead.

Remarks by Pete McCollum.

The proper name of this set is not confirmed, but is almost certainly the CIA's 'RS-5' set. I am awaiting the results of an FOIA request to CIA, which (if granted) should help to confirm the name of this set.

About 20 years ago, after seeing the pictures of an example of the set, one of the (now deceased) CIA Commo veterans remembered the RS-5 well. '*During the Korean War the outfit could not get RS-1's fast enough so they had them (the RS-5) built in either Japan or Taiwan. They wanted something similar to the RS-1. Seems they had quite a few of them built*'.

Another detail that supports the belief that this is an RS-5 set is the use of power connectors for the transmitter and receiver that match the RS-1 in both style and pinout. It would be an unlikely coincidence for these connectors to appear on a Japanese-made set without deliberate design continuity. Additionally, the dates found on the example set, 1952 and 1953, align with the Korean War time frame.

SMT-1 and RSK-253.

During the Korean War, a shortage of RS-1 radios prompted the development of a simplified alternative, the RS-5. Specifications for the RS-5 were based on the RS-1, which was work-intensive and time-consuming to produce. A production order was placed with a Japanese firm, which manufactured the SMT-1 transmitter and RSK-253 receiver, along with an associated AC mains power supply unit.
A CIA memo describes the use of the RS-5 in Albania in 1952, but other specific uses of the set are not known. Another CIA memo in February 1960 says that they had 285 RS-5 transceivers that were not needed, and recommend that the go to 'Project (redacted)'. So it appears that the maker in Japan delivered more than 285 sets to CIA starting in 1952, but made additional sets that were never delivered to CIA (but perhaps 'hoping' that CIA would some day buy them?), and those were sold as 'surplus' in Japan in 1956.

Technical details based on observations and comments by Takashi Doi, of the 'Yokohama Former Military Radio Communication Museum' and Bill Howard, are reproduced on Pete McCollum's website: 'U.S. Clandestine Radio Equipment'.

The three units of the set, along with their accessories, were housed into modified ammunition boxes: AC mains power supply left, transmitter centre and receiver right.

An amateur radio conversion of the transmitter was designed by JA1AI, a radio amateur. This rather drastic modification enabled amplitude modulation by replacing the oscillator valve with a type 6SN7. One half of the 6SN7 was used as a crystal oscillator, while the other half functioned as a screen grid modulator for the type 6V6 RF output valve.

The overall electrical design resembles a simplified version of the CIA RS-1, featuring a single frequency range but incorporating similar plugs and sockets, as well as an AC voltmeter for monitoring the AC input voltage. The receiver employed miniature 1½V filament valves and included a socket that allowed connection to a BA-48 dry battery in emergency situations. Believed to have been built around 1952 (The Albanian memo confirms the actual CIA operation with RS-5), the units were advertised for sale as early as October 1956 *(See page 5)* in the Japanese amateur radio magazine 'CQ', by Yamashichi Shoten, and later by Toyamura Denki Shokai, both Japanese surplus stores.

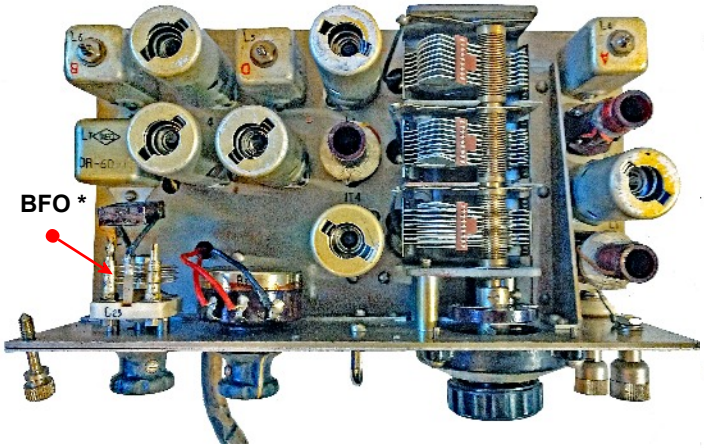
Receiver nomenclature.

There has been some confusion on the actual type number of the receiver: Written on the original circuit diagram was 'RSK-253 SW receiver schematic diagram', whilst in the adverts of the surplus store Yamashichi Shoten, consistently 'RKS-253' was used. Considering the authenticity of the first source, RSK-253 should be used. A typo was most likely made in the advert, and never corrected. (*Pete McCollum*).

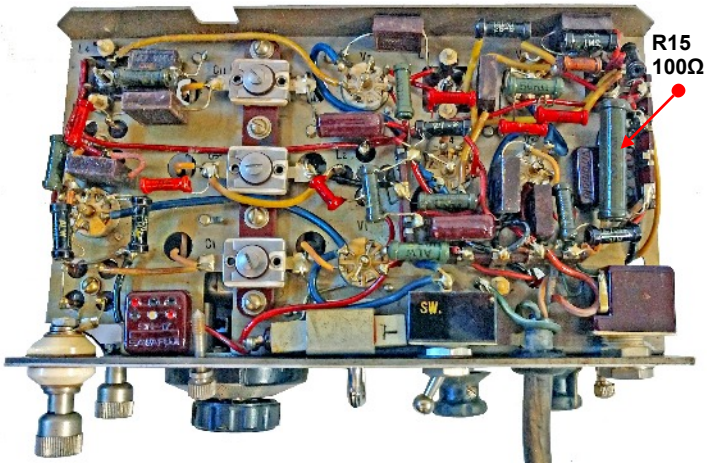
Text original circuit.

RKS–253 受 信 機

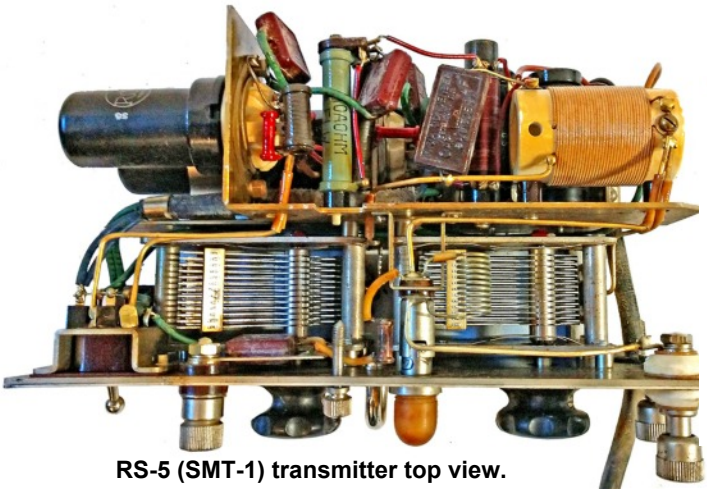
Text advertisement in 'CQ' (Japan).



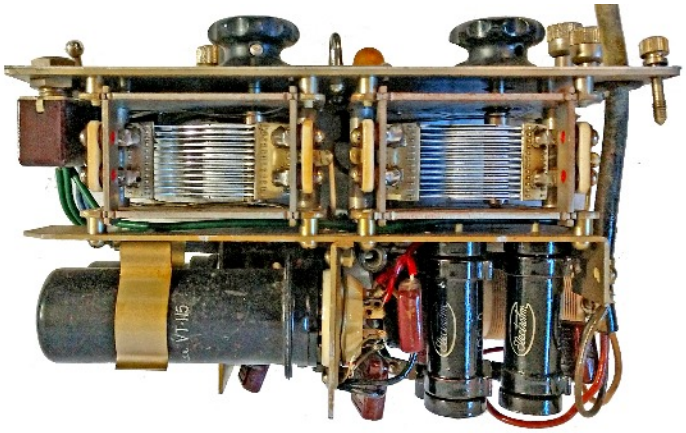
Under side view of RS-5 (RSK-253) receiver chassis.
***) The BFO was not disabled by short-circuiting the BFO pitch condenser at 180°-360°, as is seen in the RS-1 receiver.**



Top view RS-5 (RSK-253) receiver chassis. Note that the 90V HT negative is connected to earth via R15 (ref. Page 4).

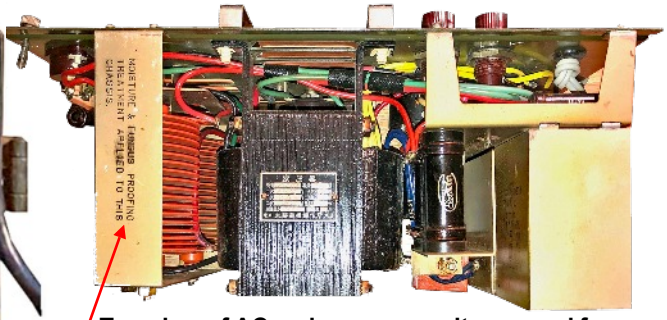


RS-5 (SMT-1) transmitter top view.

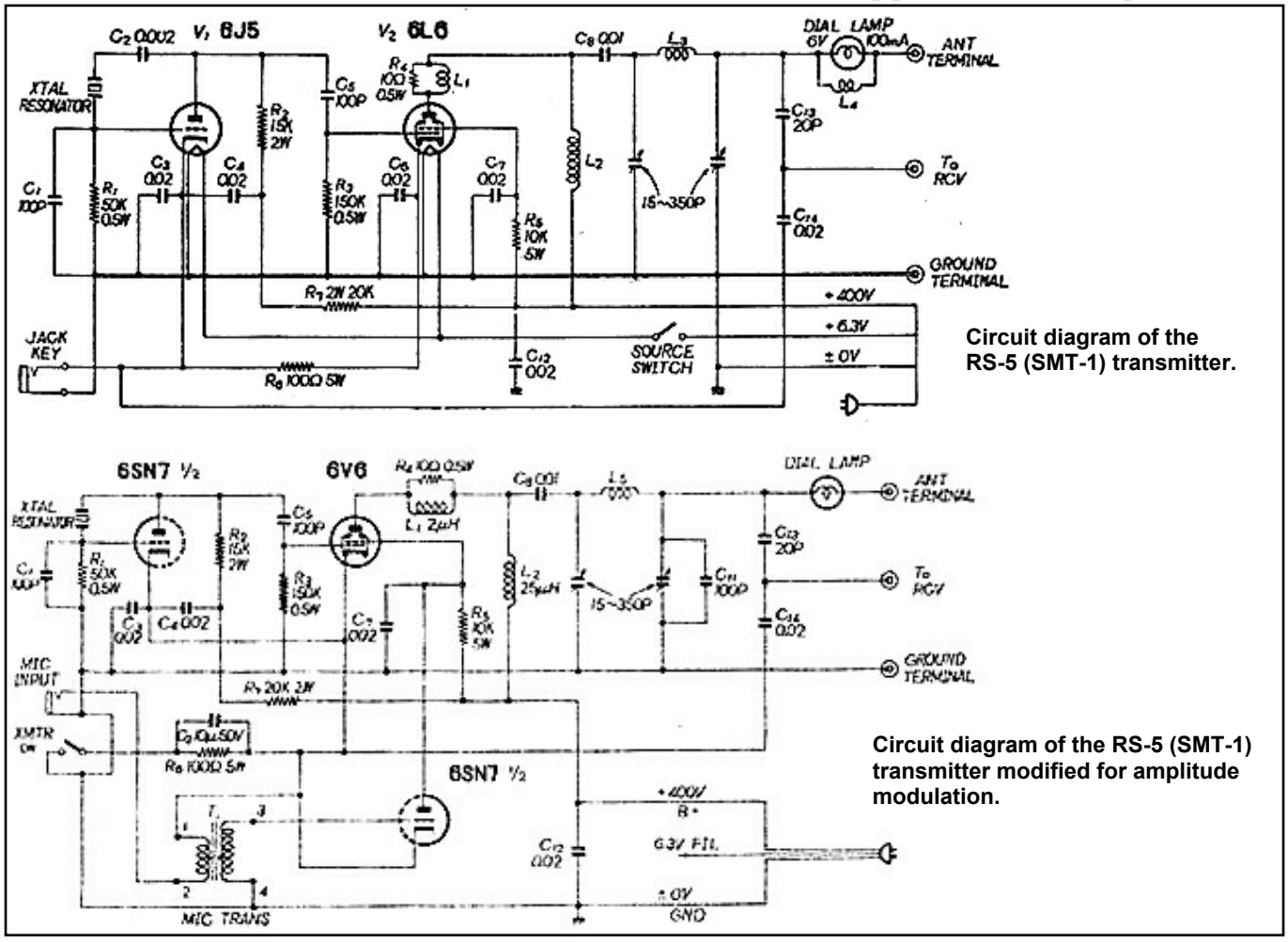


RS-5 (SMT-1) transmitter bottom view.

Front panel of AC mains power unit. The top of the 90V receiver OB2 voltage stabiliser protrudes through the front panel, serving as a pilot light.

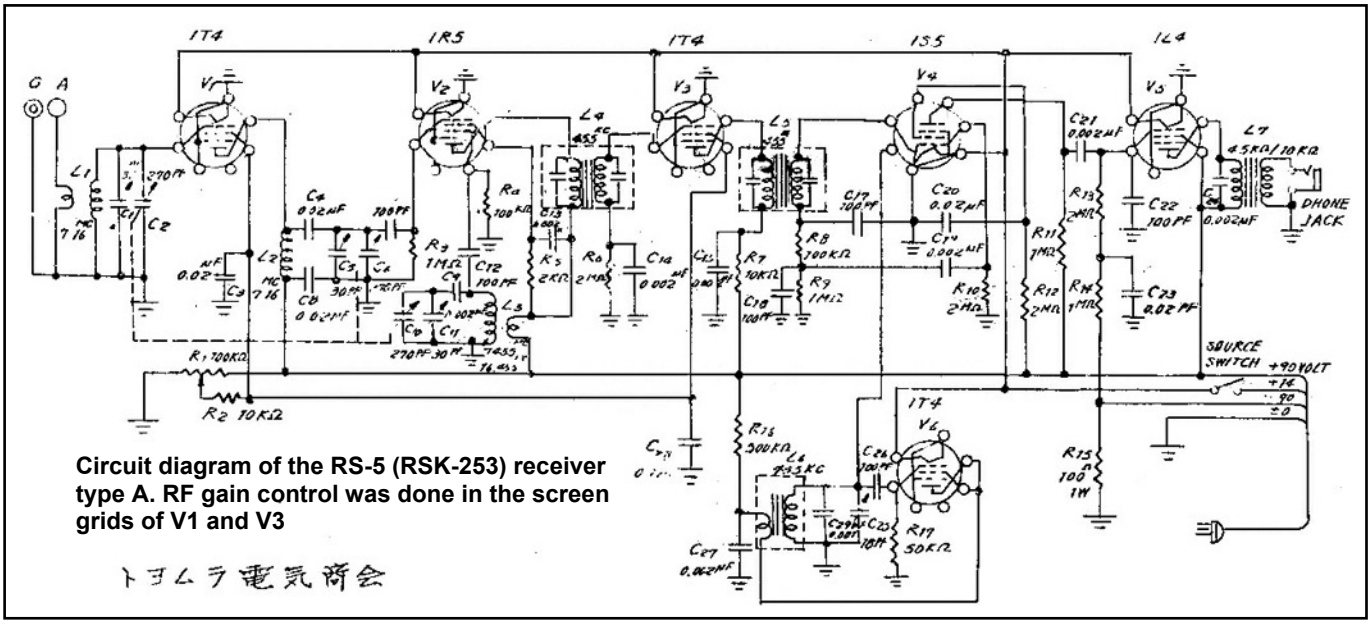


Top view of AC mains power unit removed from its enclosure. Note the 'Moisture and Fungus Proofing' (MFP) treatment applied in 1953. (The actual date was found on the receiver chassis).



Circuit diagram of the RS-5 (SMT-1) transmitter.

Circuit diagram of the RS-5 (SMT-1) transmitter modified for amplitude modulation.



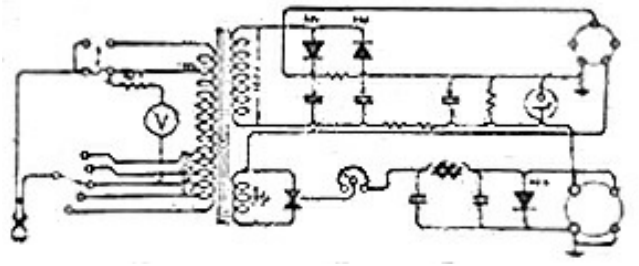
Circuit diagram of the RS-5 (RSK-253) receiver type A. RF gain control was done in the screen grids of V1 and V3

Pete McCollum remarked that the RS-5 receiver's power connector is compatible with the BA-48 battery, the same battery as used with the RR-2 receiver in the RS-1 set when operated as a stand-alone unit.

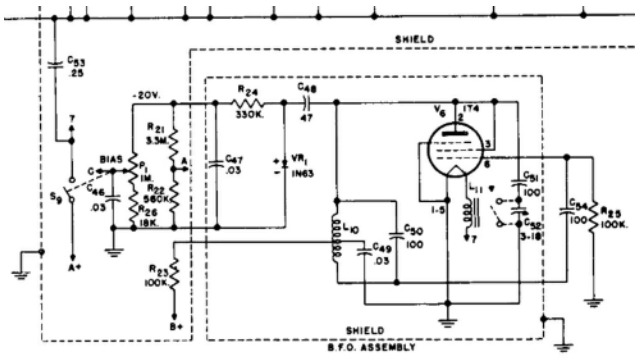
RS-5 (RSK-243/SMT-1) AC Mains power supply unit.

Power for both the transmitter and receiver was obtained from AC mains, selectable in two voltage ranges: 80–120V or 180–220V. The desired range was chosen by inserting a fuse into either the 100V or 200V fuse holder located on the front panel. Fine voltage selection was available in 10V increments, with the operating voltage set to 100V as indicated on the built-in meter.
There is a flaw in the circuit diagram of the power supply: the -90V HT line intended for the receiver is incorrectly connected to ground. It should instead be connected directly to the receiver, where it serves as the negative bias for the AF output valve. In the current configuration, resistor R15 (100Ω) in the receiver circuit would be short-circuited, leading to AF output distortion and excessive HT current through the AF output valve.

While investigating a potential drawing error by comparing it with the earlier RS-1 receiver unit (RR-2), which had the negative HT connected to earth, an interesting bias voltage solution was identified. This observation offered valuable insight into the circuit's grounding and voltage configuration. See below for more details.



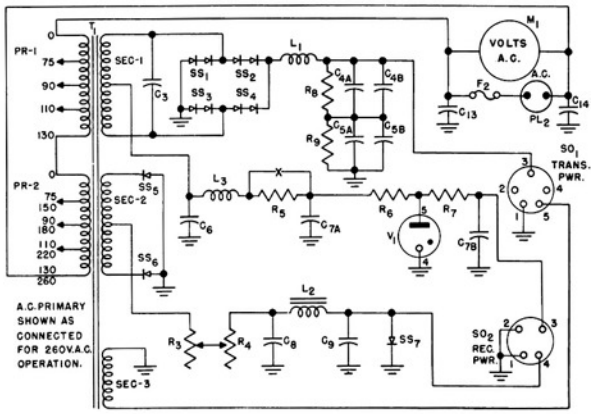
Circuit diagram of the RS-5 (RSK-243/SMT-1) AC mains power supply unit. Note that the -HT is connected to earth.



BFO and bias supply in the RS-1.

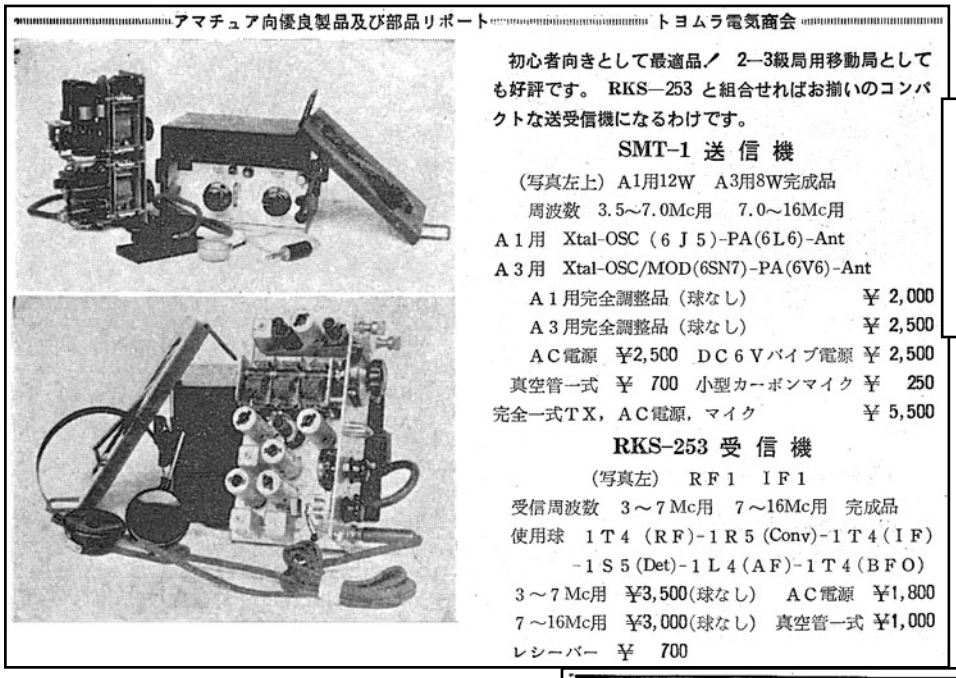
RS-1 (and RS-6) bias voltage feature.

Although not directly related to this RS-5 chapter, the following is an interesting circuit feature: In the receiver of the RS-1 (and RS-6), the negative bias for the AF output valve and the control voltage for the gain control were derived by rectifying a small portion of the BFO valve's RF output. This output was continuously operative, ensuring a consistent source for bias and control voltage. To receive AM, the variable BFO capacitor short circuits for 180° of rotation, resulting in operating the BFO on a different frequency. This feature was not implemented in the RS-5, although its BFO was continuously operative.



Simplified circuit diagram of the RP-1 power unit for AC mains operation.

The RS-1 comprised the RP-1 power unit (left), transmitter RT-3 (top right), and receiver RR-2 (below right). It is believed that the RS-5 (RSK-243/SMT-1) was a simplified version of the RS-1.



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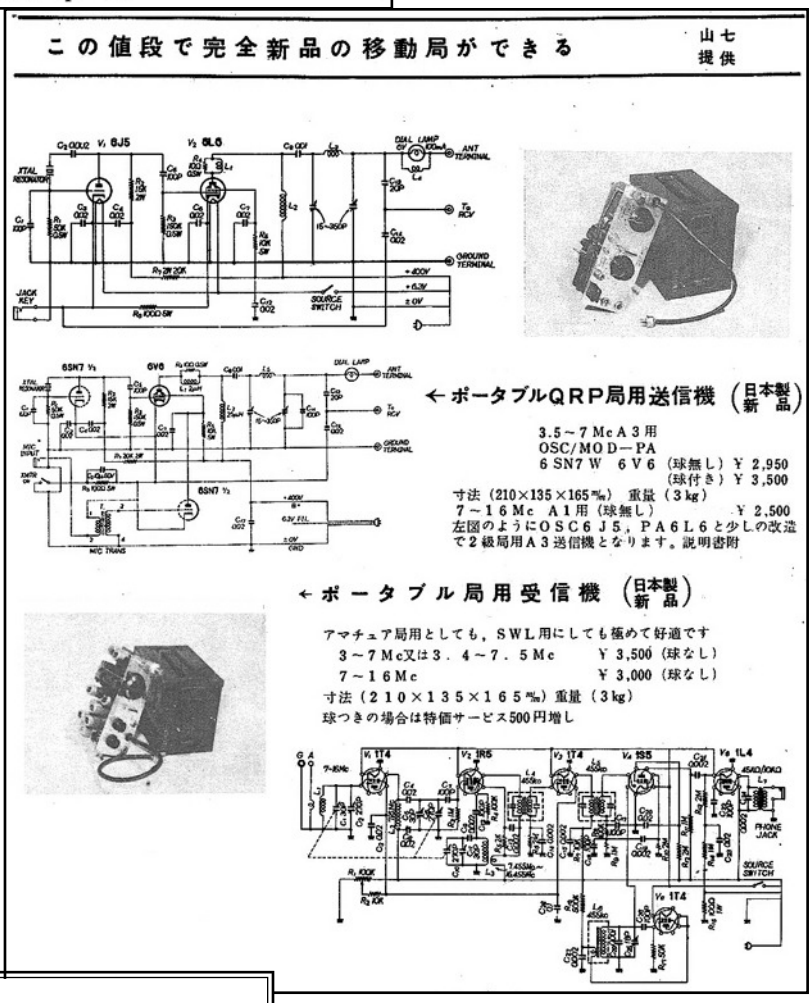
周波数　3.5～7.0Mc用　7.0～16Mc用
A 1 用　Xtal-OSC（6 J 5）-PA(6L6)-Ant
A 3 用　Xtal-OSC/MOD(6SN7)-PA(6V6)-Ant
A 1 用完全調整品（球なし）　¥ 2,000
A 3 用完全調整品（球なし）　¥ 2,500
AC電源　¥2,500　DC 6 Vバイブ電源　¥ 2,500
真空管一式　¥ 700　小型カーボンマイク　¥ 250
完全一式TX，AC電源，マイク　¥ 5,500

RKS-253 受 信 機

（写真左）　RF 1　IF 1
受信周波数　3～7 Mc用　7～16Mc用　完成品
使用球　1 T 4（RF）-1 R 5 (Conv)-1 T 4（IF）
-1 S 5 (Det)-1 L 4（AF）-1 T 4（BFO）
3～7 Mc用　¥3,500(球なし)　AC電源　¥1,800
7～16Mc用　¥3,000(球なし)　真空管一式　¥1,000
レシーバー　¥ 700

An advertisement in 'CQ' (Japan) featured the original Japanese Morse key and headphones that were included with the SMT-1 and RSK-253. When not in use, these accessories were stored in the designated partition within each unit.



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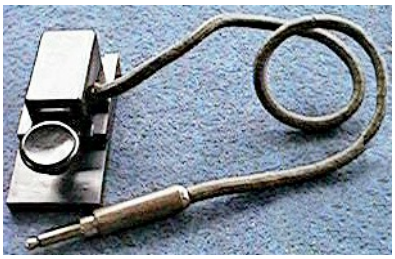
球つきの場合は特価サービス500円増し

This page contains two scans of advertisements related to the sale of the SMT-1 and RSK-253 in Japan. These were first published in the October 1956 issue of 'CQ' (Japan) and subsequently appeared at irregular intervals until February 1959, distributed by Yamashichi Shoten, a Japanese surplus store.

Later advertisements from another store, Toyomura Denki Shokai, included in-house circuit diagrams for both the receiver and the original and modified versions of the transmitter. Around that time, JA1AI had modified the SMT-1 transmitter for amplitude modulation (AM) operation. The modified version, prepared by the store, was also offered for sale, albeit at a higher price.



The wartime Japanese Morse key, Model No. 2B, was issued with the SMT-1 transmitter.

References

- Pete McCollum's 'U.S. Clandestine Radio Equipment' website:
  - https://spyradios.com/rs5.html
- Yokohama Former Military Radio Communication Museum.
  - Website: www.yokohamaradiomuseum.com
  - Bulletin board: http://www.yokohamaradiomuseum.com/cgi-bin/imgboard.cgi
  - https://www.facebook.com/groups/1687374128228449/
- Correspondence with Takashi Doi and Pete McCollum.
- Various declassified CIA reports on the RS-5.