

Italian pocket transistor radio: radiolina WATT RADIO mod. cit

by Lello Salvatore ed Angelo Franzè*
English version edited by Bob Davidson**



Fig.1-a



Fig.1-b

As Mauro Riello, an enthusiastic collector of vintage radios as well as an authentic Turinese, explained to me, *cit*¹ is the dialectal term used in Turin (the city of the FIAT in the Italian region Piedmont) and its surroundings to refer to a child. And *cit* is the curious but appropriate name that the Turin-based company WATT RADIO, already established at the time both in the radio and TV fields, gave to its first and only pocket-size transistor radio (Fig.1-a and b, above):

its logo, in italic type, stands out on the front side, in the lower left corner. (Fig.2)

It is in the ANIE N.6 catalog of the Radio and Television maker group, related to the production 1960-61, that we find, for the first time, the review of this small radio receiver, *this radiolina*, while on page 10 of N. 253 (September 1960) of the specialized magazine *Radio Industria* is depicted in almost exact size one of the first ads of the *cit* (Fig.2). With its very small dimensions of 109 mm in width x 70 in height and 33 in depth, the "Cit" is one of the first pocket-sized transistor radio sets produced and marketed by Italian industries in response to competition from foreign manufacturers, especially those of the Land of the Rising Sun (Nippon) who were flooding the world with their radios. Skimming through the pages of the aforementioned catalog, in addition to the "cit", we find in fact reviewed several other transistor radios, which are slightly smaller or larger than this set. For an immediate comparison with the *radiolina* (small radio) *cit*, it may be useful to report on these pages the short list, alphabetically ordered, of all the "cit size-radios" (really 13!) presented in it. Thus we find: the Atlantic² T161



* lellosalvatore@inwind.it ~ angelo.franze@alice.it ~ ** robertd3131@gmail.com

¹ In Turin there is also a small and historic neighborhood, the only one that has only a Piedmontese name: it is the Cit Turin, that is "Piccolo Torino" being Turin in Piedmontese a male name.

² The ATLANTIC PHILCO was a company in Lombardy (the Italian region with capital city Milan) that sold TV sets, refrigerators and radios in Italy as dealer of the American company Philco. Before separating completely from Philco and becoming ATLANTIC ELECTRIC spa, it had already put on the market with its new brand, radio and television sets that were still based on the Philco models and used a mix of American and Italian components. Dealing with transistor radios, it comes to my mind the ATLANTIC T5, a super-heterodyne receiver with only 4 transistors and a re-

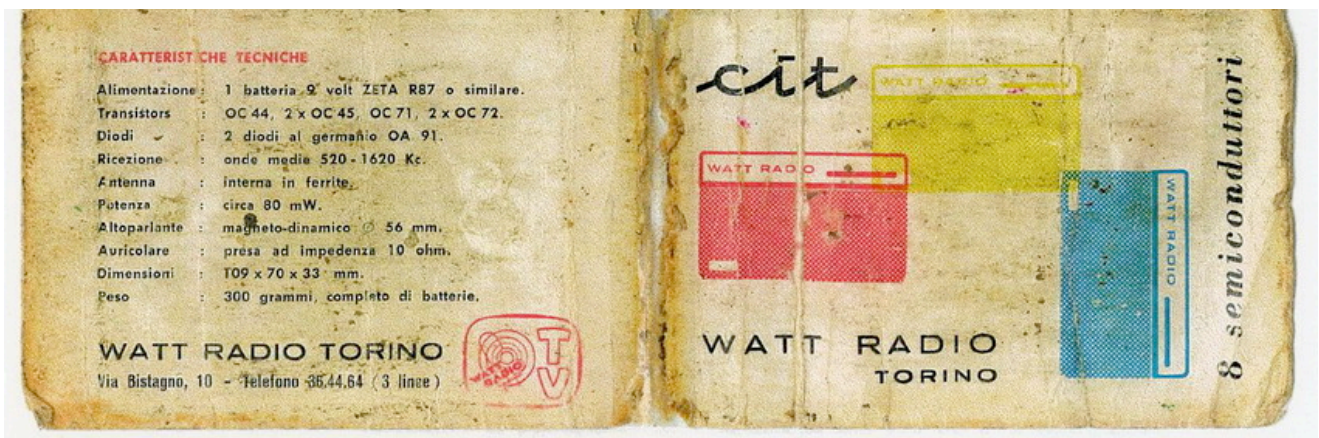


Fig.3

(mm 60 x 105 x 25); the model Pocket 0616 (mm 117 x 77 x 39) of the CGE; the Poket model (65 x 105 x 25 mm) of the Europhon; the Geloso model G 3303 Polaris (mm 70 x 120 x 30); the R 610 T (100 x 70 x 30 mm) of the Incar; the Jolly model JM / 658 (126 x 75 x 28 mm) by Muzzini Junco; still by the Muzzini Junco, the two ParKanal model SM / 659 and model SL / 660 (with the identical dimensions of 63 x 107 x 25 mm); the Transix (75 x 115 x 30 mm) of the SNT; the model 606/1 Jet (mm 75 x 125 x 38) of the SpA Luigi Cozzi Dell'Aquila; the Royal Baby model (117 x 76 x 34 mm) produced in the Italian factory of the German company Telefunken; the 61/2 model (124 x 76 x 36 mm) of the Unda Radio and, in closing, the Magic, model 750 (75 x 114 x 35 mm) of the Voxson-Faret. To add to the above list, is the GBC (**Gianbruto Castelfranchi**) pocket radio receiver named "giby" (mm 70 x 103 x 32) and marked with the lettering AR/19 or SM/19 depending on whether it was purchased "beautiful and ready" (already assembled) or in assembly box. Even this latter radio came out on the market in 1960 but, like all GBC sets, was not reviewed in the aforementioned Anie catalog.

The cit is not new to the readers of the Italian vintage radios journal "Antique Radio Magazine" who dealt with it several years ago, in issue No. 58, when the subscriber and collector Beppe Cremonini made his set available, marked by the serial number **TC 18712**, equipped with its beautiful booklet supplied with the radio at the time of purchase: this 6-page booklet contains the technical features (Fig.3) and instructions for using the radio.

The characteristics indicate the abbreviations of the eight semiconductor devices used, all of them germanium type, ie 2 OA91 diodes (note that in the schematic diagram the diodes have both the initials OA90) and 6 Philips transistors, in the form of a pad, enclosed in a black painted glass case and precisely (starting from the antenna [front end] and proceeding towards the loudspeaker) an OC 44, two OC 45 and an OC 71. The remaining transistors, the two OC 72, mounted in the audio frequency output stage, have the glass case covered by a metal capsule for better heat dispersion

The surprise of the cit

Sometimes discoveries happen by chance, and even if they are not very important because they concern a very small circle of people in the world, as are the collectors of vintage radios in general and even more those of transistor radios, they do arouse some interest among enthusiasts of the sector and the curiosity to learn more.

Recently Angelo Franzè, transistor radio collector in that of Udine with whom a beautiful friendship was born that is also realized in the frequent and profitable exchange of technical knowledge and experiences on this kind of radio sets as well as on their collecting, found on his workbench the ivory colored example of the model above, shown next to the beige one, in the opening images. While the beige one (identified by the serial number **TC 11333**) has belonged for

flex circuit in it.

years to the collection of Angelo, the other of ivory color (without the indication of the serial number) is a recent purchase of mine that I had put aside while waiting to find the 98 mm ferrite rod with a cylindrical shape and about 6.3 mm thick which was broken and reduced to the length of a cigarette butt. When Angelo told me he had found in an old Philips radio scrap (the Personal model 2, Type L1132T to be exact) the ferrite rod that was fine for my cit having the same small diameter, not so common in ferrites for small radios (*radioline*), I had a start of joy: the ivory cit I had already repaired but because of the inefficient antenna did not receive the stations well, but now it could regain its original efficiency. There was, however, the small problem that the rod recovered from the scrap chassis was long and had to be cut to the correct length of 98/100 mm in order to make it fit into the cabinet of the cit. Angelo, with the courtesy that distinguishes him, offered himself to cut the fragile ferrite and that was how I sent him this *radiolina*.



Fig.4

panel of both and look at the assembled components, in particular the six transistors: in Angelo's beige one (Fig.4), as well as in Beppe's one, the transistors are all mounted upside down and four of these are black while the other two (the T5 and T6 in Fig.4) are silver in color. These transistors are the same as those listed in the booklet we have seen before and reported, with the same identifications, in the schematic diagram (Fig.8) published in the article and which is taken directly from the publications of the "Technical Service Bulletin" of WATT RADIO. This schematic, with the same six transistors, is the same we can find on page 294 of the 1st volume of the schematics of the Turin publishing house Antonelliana and also on page 306 of Volume II of the CELI publisher: the fact is that it is a recurring diagram schematic, probably the only one of the House and the only one available (at the moment) in the various vintage magazines and in the "boundless" world wide web (www). By detaching the ivory colored cabinet back cover

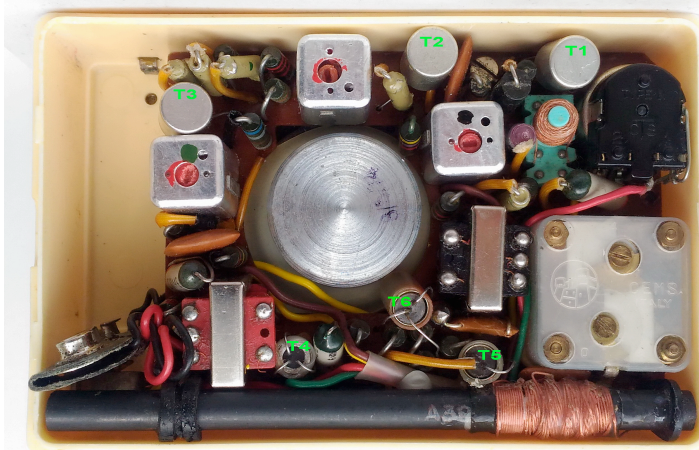


Fig.5

mounted upside down and bear the same lettering OC72 the two output power transistors (T5 and T6 in the photo), while the driver is an OC75N (T4 in Fig.5) in all metallic case. If the different transistor (the OC75N), used as a driver in the audio frequency stage is more powerful in terms of gain than the previous OC71 (T4 in Fig.4), the new types used in the radio frequency stages are

Helped also by his friend Giorgio, who brought a "dremel" at very high rpm (number of revolutions per minute) and a special diamond blade, Angelo finished his good and painstaking job returning then the radio, with the due, inevitable thank-you from me. Before he sent my *radiolina* back he took his beige color set and compared it carefully with mine and here, surprised, he noticed the diversity of the two printed circuit board (chassis) mounted in this model. The first differences between the two models of this radio can be seen at a glance. It is sufficient to open the rear

(Fig.5) we note instead that the first three of the six transistors have a different outline (standard Jedec TO 7), they are now in a metal case, have a fourth shield terminal and are mounted as usual in head on: these are the radiofrequency transistors, the OC170 converter (indicated with T1 in the photo) and the other two, of intermediate frequency, with the lettering OC169 (T2 and T3 in the photo) in substitution, respectively of the OC44 and the two OC45. The remaining transistors, those of the audio frequency stages, are still

technologically innovative and built for operate at higher cutting frequencies and therefore and also in sets equipped with the Short Wave (SW) band: these are the so-called *drift transistors*, those built by combining the two main techniques used then in making semiconductor junctions: the one by alloy with that of diffusion. In his very interesting site "Transistor History", the New Zealander **Mark PD Burgess** devotes a long chapter to the history of Philips semiconductors and its subsidiaries such as the British Mullard which under the guidance of J. Beale produced and developed in the laboratory of Salfords, independently of the Natlab (Natuurkundig Laboratorium) of Eindhoven (Netherlands) which went on its behalf, the technique of manufacture by alloy and diffusion. And, as we read at the web address: <https://sites.google.com/site/transistorhistory/Home/european-semiconductor-manufacturers/philips>, the OC170 was the first alloy and diffusion transistor of the Philips group and was distributed in the late 1950s.

Besides to the high frequency transistors, the other salient difference concerns the two chassis which, despite having the same dimensions, have a different design of the conductive tracks of their printed circuit as can be clearly seen by turning them on their printed side and putting them close together for comparison (Fig.6 and 7). On the first chassis used in our "cit" the lettering **WR** we can read, also etched as the photoengraving circuit, is placed vertically to the left of the tuning capacitor while on the second chassis (that of my ivory cit) the same lettering **WR** together with the mysterious number **5210** appear above and below the shaft of the tuning capacitor, respectively. Moreover, in the 1st chassis the copper tracks are completely tinned while in the 2nd type the tracks appear covered with a green paint.

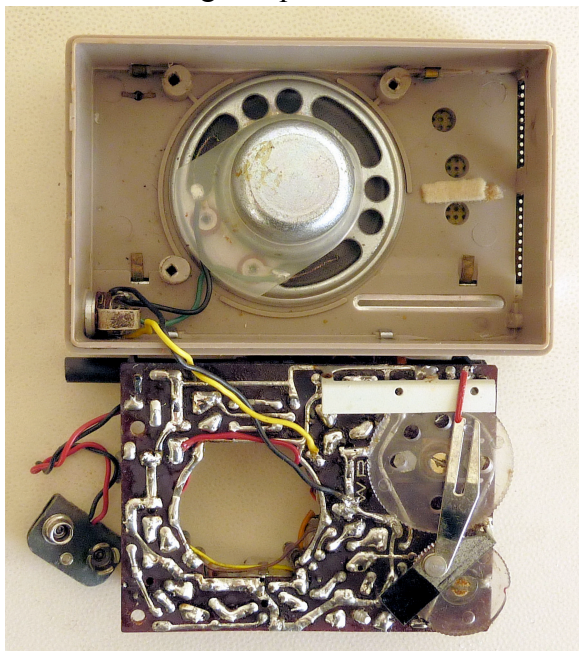


Fig.6

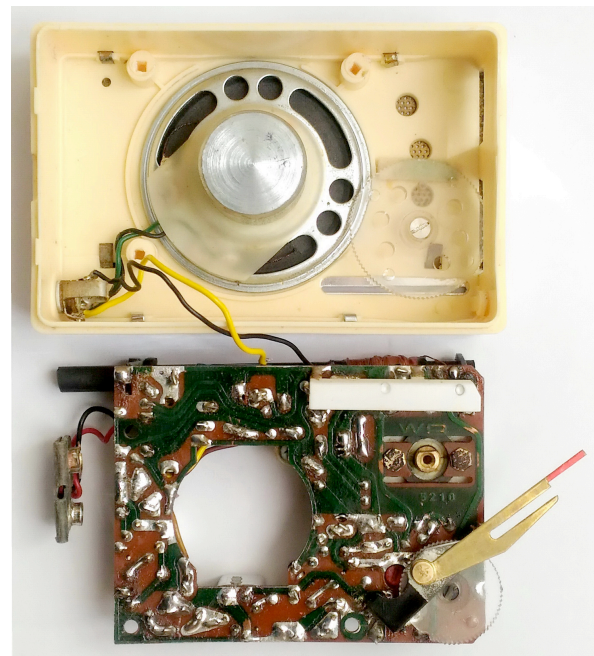


Fig.7

Looking and looking again the two chassis from both their respective sides, even the distracted reader cannot miss the different location of some components (transistors, intermediate frequencies and output transformer), in addition to the different design of the conductive tracks and the different position of the WR that evidently stands for Watt Radio and the "mysterious" number. It doesn't get away also the special mechanism created by the firm to rotating the tuning capacitor knob without gear and consequently move the red index on the white metal background of the slide-rule dial.

Both Angelo and I, took the trouble to follow the conductive tracks and components of the second chassis having the recurring schematic of the cit in hand (Fig.8): apart from the elimination of the damping diode from the 2nd chassis (indicated with D1 in the diagram shown here and excerpt from page 87 of Radio Industria N.280 - December 1962) we did not find any significant circuit differences. However, the cit set remains a superheterodyne radio receiver in the conventional classical scheme of a radio set of that time, made with 6 transistors, operating on the Broadcast

band (Medium Waves) of which its fine transistor converter in the front end circuit (T1 = OC 44 or OC 170) followed from two intermediate-frequency stages (Fig.8), that is two transistors (OC 45 or

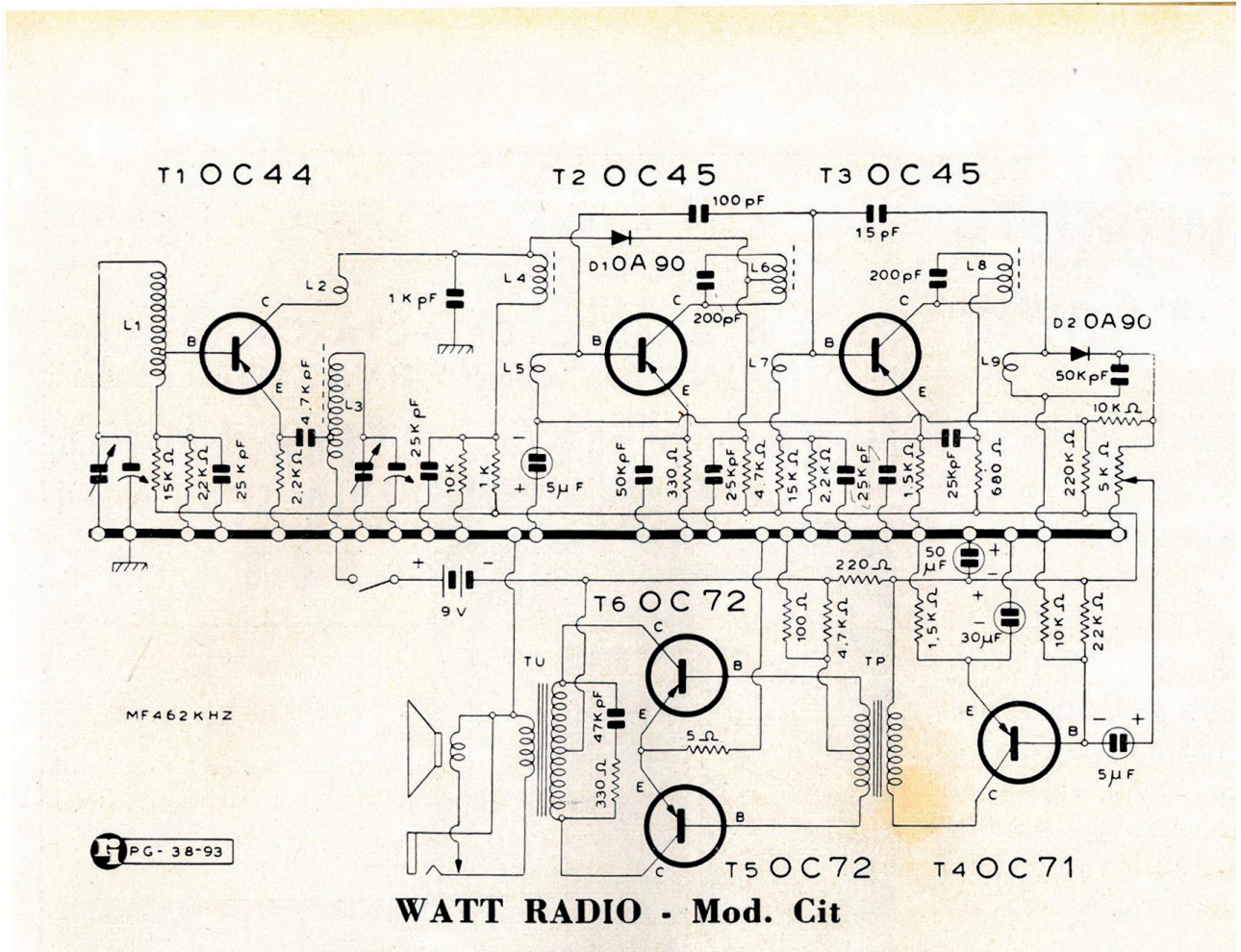


Fig.8

OC 169) and three intermediate-frequency transformers set to 462 kc, from the detector diode (an OA90 or OA91 or similar) and from the CAV circuit. This is followed by the driver transistor, of those already seen or similar, which in sets with limited output power as this, also acts as preamplifier as well as driver of the two audio output power transistors. The output stage transistors are connected to each other in push-pull through two audio transformers, placed one at the entrance and one at the output of the matched transistors. The small 57-mm-diameter magnetodynamic loudspeaker, as stated in the booklet but also on the Anie, delivers an output power of 80 mW with 10% distortion.

Production, market, collecting



Fig.9

According to what we have said, it seems that the second chassis with the printed circuit of the cit has not been constructed with the intent of designing / hosting a new different circuit but evidently for the need to use the new drift transistors which have a greater bulk than those made of glass and required more space. The other electronic components used in this radio, although supplied by different manufacturers (for example the variable CEMS condenser in the 2nd chassis instead of the CONVAR) have approximately the same dimensions. However, the fact remains that the different chassis and any new schematic diagram that (if it came out) would not include the damping diode, there is no trace. While I'm writing, on the note "bay", the electronic platform of eBay.it, there is the insertion of a WATT RADIO catalog of both televisions and radios and among the radios

(as per the picture I asked and I received from the seller) there is also the cit in whose specifications is indicated the presence of a single diode, the one detector. It is important to note that the OC44 (T1) and OC45 (T2 and T3) transistors are reported not only in the booklet of the company, but also in the first Anie review of the cit, that of the sixth volume (biennium 1960-61) which, we have seen, use the 1st chassis. In all the following four Anie catalogs, up to and including volume 10, relating to the two-year period 1964-65 and which is the last Anie where the cit makes its appearance, the review of the same indicates for the high frequency always the types OC170 - 2/OC169 that we see mounted on the 2nd chassis. For the transistors of the cit operating instead at the audio frequencies there are variable initials that see the use now of the pair of the two matched OC72 (Anie volume 6, 7 and 10) now of those signed OC74 (in Anie volume 8 and 9). Then, while on the Anie volume 6 and 7 as driver transistor the OC71 is indicated, on the remaining volumes the OC75 appears and there is no trace of the OC75N mounted on my ivory cit which is however an equivalent of the OC75.



(Fig.10)

From the establishment of WATT RADIO¹ in Bistagno street 10, in the popular Santa Rita district in Turin, the cit was produced until the mid-1960s, housed in a styron cabinet (a trade name of a plastic material derived from styrene) and was available in five color variations: **beige, ivory, gray, red and blue**. The beige (like that of Angelo) is mentioned together with ivory, gray and red, only in volume 6 of the Anie and therefore we assume that it uses only the 1st chassis; the blue cit, visible on page 232 of the unique "Transistor Radios" guide, together with the colors ivory, gray and red, appears only in volume 7 of Anie and therefore it is assumed that only the 2nd chassis is mounted. What else to say about this 2nd chassis?..... I don't know. We can add that at the moment (March 2019) the specimen of cit with the 1st chassis and the highest serial number (**TC 23819**) that I and my small circle of collector friends know is of ivory color and lies in the collection of the friend Mauro Riello. Mauro also has the cit with serial number **T.C.26482** already equipped with the 2nd chassis, always in ivory, all original and never used as well as complete with the original packaging box (Fig.10). And the red cit is also part of the Riello collection (Fig.11), which also has the 2nd chassis and is missing (but it is not the only one without it) of the important serial production number. For information, I would like to add that on the Radiomuseum.org website both the chassis of the cit are shown but only on the side with the components seen and not on the printed circuit. The 2nd chassis on this virtual museum shows the serial number **T.C. 28998** and is mounted in a blue colored cabinet (Riello collection).



Fig.11

In 1960, the year of the Rome Olympic Games and also of the launch on the Italian market of many pocket radios of national manufacture, one our cit radios cost 20.000 Lire without the accessories (leather bag and earphone) that could be purchased on request. As the precious Anie catalogs report, the same price was also indicated in 1961-62 but also included the leather handbag (not the earpiece) while the price (finally!) dropped to 17,900 Lire, then to 15,900 Lire until it reached, in 1964-65, its minimum equal to Lire 14.900, without any specification, however, on the presence or absence of accessories. If, as stated on the Leonardo.it web site at the web address:

¹ A brief story of WATT RADIO, which is among those companies that have made the history of radio in Italy, is traced by Aldo Andreani on N.142 of Antique Radio Magazine, in his description of the "Transset" of this firm.

<https://cronologia.leonardo.it/welcome.html> that in 1960 a hectogram of *mortadella*¹ cost about 75 Lire on average and that a generic worker earned about a salary (I'm considering net and the absolute minimum) of 47,000 Lire, then remembering the considerations that I had already made ten years ago when I talked about the SNT pocket receiver

(the Transix), when Leonardo.it did not yet exist, it can be said that even the Watt Radio pocket radio was not really within reach of all budgets! Saving, but only a little, in 1960 you could buy some other pocket radios as the same Transix sold for 19,500 Lire complete with earphone, leather handbag and battery or the GBC giby also sold for Lit. 17.000 complete with bag, as from the vintage journal Selection of Tecnica Radio - TV N.2 / 1960. If you wanted to save more, you could buy at that time one



Fig. 12

(but not all the brands though!) of the nice pocket radios that came more and more numerous from far away Japan. These sets, like the modern electronic and non-electronic artifacts that arrive today from China, they then had more affordable prices (and not only because they can also be found on the black market), perhaps also because of the reluctance of the Italians, a predominantly conservative people, to buy products from such unknown countries. In fact, what about the price of Lire 13,500, to be paid to the postman, who was offered the "cute japanese", the *radiolina* Global GR-711 (on ARM N.77 of March-April 2007) supplied with 1 year warranty by I.C.E.C. of Latina? The relative ad (one of the first) can be found on the journal *Costruire Diverte* N.5 / 1961 and also on other magazines of the time that, as you know by now, can be downloaded for free in that mine of magazines that beautiful people publish and maintain on the site of Introni and to whom goes our most lively "Thanks"! I report their web address below: <http://www.introni.it/riviste.html>



without S.N. L. Salvatore collection)

of an auction lasting seven days, at the same

To conclude I must say that in the many years in which I am passionately devoting myself to collecting transistor radios, I have noticed that the *radiolina* of WATT RADIO, the cit is not reflected among collectors the satisfaction and value it deserves. It is seen around, often and for some time, in the various second-hand shopping sites that exist today on the web without anyone rushing to buy them, even though they may be in very good shape. These days on eBay there was one of ivory color, serial number **TC18780**, with the 1st chassis, in good condition and working as well as having a leather handbag, which was sold at the end Fig.13 (gray, 2 chassis,

same sale price fixed at the start, to the only

bidder for the modest sum of € 24.90! Yet this *radiolina* cit is not only an object of a very lively period in the history of Italy but it is also a beautiful interesting piece that cannot miss in a self-respecting radio collection because ... it sounds good, it has its earphone socket, mounts the old germanium transistors, is one of the first and smallest of the Italian ones and has already, instead of the old numbered tuning wheel, a slide rule dial. And then, looking at it more closely, it is also

¹ Mortadella (Italian pronunciation: [morta'della]) is a large Italian sausage or luncheon meat made of finely hashed or ground heat-cured pork. For further informations about mortadella, have a look at: <http://www.weareitaly.net/en/product/Mortadella/emilia-romagna/Mortadella-Bologna-IGP.html>

pretty because of its reverse-painted dial (which made a lot of Japanese radios look pretty) and a front grill that changes color depending on the color of the cabinet: golden in ivory, gray dark in the beige one, white in the red one, silver in the gray one.

~ As often happens with my articles, this also arises from the exchange of information, photos and other material between collectors and vintage radio enthusiasts, I would say, in the sign of the famous proverb "Union is strength", of which recently reminded me of Ale ~

Acknowledgments and Notes

First of all I thank Angelo Franzè who, as a careful collector and expert radio technician, collaborated with me in the realization of this article. A sincere thank you also goes to Mauro Riello for the photos and information provided as well as to Adriano Michellini who, every time I contacted him, always did his best to provide me with the necessary material: the photo of the ad and the diagram schematic of the cit are of him

~ A special thanks to Bob for his proofreading work of my translation from Italian into English ~

Thanks also to Mark PD Burgess (who will only know about this article when it will be translated into English) to share, through his website, a wealth of valuable information on transistors, those vintage electronic devices that are inside the vintage transistor radios like the "Cit" and that are the basis of modern integrated circuits and microprocessors (microchip): <https://sites.google.com/site/transistorhistory/Home>.

Salerno (BZ), 19.03.2019

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Lello Salvatore ed Angelo Franzè

Please note: - The Italian edition of this article will be published in the issue N°152 (November-December 2019) of the Italian bimonthly journal for vintage radios, Antique Radio Magazine. You' ll can find the Italian-language issue at: http://www.antiqueradio.it/ARM/index.php?option=com_virtuemart&Itemid=1