

# Oral-History:Edward Tudor

## About Edward Tudor

Edward Tudor was the president of Regency Electronics, formerly I.D.E.A., when it produced the first transistorized radio, TR-1, in 1954. I.D.E.A. had been formed by three engineers who, like Tudor, had worked at RCA (/RCA\_(Radio\_Corporation\_of\_America)); they left to pursue ideas relating to film sound that RCA (/RCA\_(Radio\_Corporation\_of\_America)) had rejected. Tudor joined the company after World War II. In the interview, he outlines the events surrounding the development of the radio, from meetings with Texas Instruments president Pat Haggarty (/Patrick\_E.\_Haggerty), through the breakneck design process and rollout for the 1954 Christmas season and the subsequent significance (in terms of percentage of sales) of the radio for Regency. His account differs in some respects from that of Richard Koch (/Oral-History:Richard\_Koch): he doesn't recall a veil of secrecy around the initial meetings with TI or that he was especially worried that the Christmas deadline would be met.

## About the Interview

EDWARD TUDOR: An Interview Conducted by Michael Wolff, IEEE History Center, 29 January 1985

Interview #462 for the IEEE History Center, The Institute of Electrical and Electronics Engineers, Inc.

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## Interview

Interview: Edward Tudor

Interviewer: Michael Wolff

Date: 29 January 1985

Place: Telephone interview

## **Current Business Involvement**

**Wolff:**

To begin, what is your current position?

**Tudor:**

I'm presently a consultant and the owner of a new company called High Tech Systems, Inc., a manufacturer of power line conditioners.

**Wolff:**

What is AMI? Is that the company to which you are a consultant?

**Tudor:**

Yes. I also have office space in their building.

**Wolff:**

In what city is the company you own?

**Tudor:**

Lebanon, Indiana.

## **Arrival at Regency Electronics**

**Wolff:**

Okay. You came to Regency after the Second World War, I believe.

**Tudor:**

That's right.

**Wolff:**

Do you remember what year you came to Regency?

**Tudor:**

Regency started out as an engineering firm called Industrial Development Engineering Associates Incorporated (I.D.E.A.). I went there in 1946. It had been started by three other engineers from RCA (/RCA\_(Radio\_Corporation\_of\_America)). We had all worked at RCA (/RCA\_(Radio\_Corporation\_of\_America)) before the war or during the early part of the war.

**Wolff:**

You were an engineer?

**Tudor:**

Yes.

**Wolff:**

What kind?

**Tudor:**

I was an electrical engineer.

**Wolff:**

You were an EE and you had worked at RCA (/RCA\_(Radio\_Corporation\_of\_America)) early in the war.

**Tudor:**

Yes.

**Wolff:**

I.D.E.A. was started by the other three people. Is that right?

**Tudor:**

That's right. I joined them when I got out of the military. I guess it was 1947 or 1948 that we incorporated and started manufacturing various designs we had developed earlier during the [unintelligible word] engineering company.

**Wolff:**

What was the main product then?

**Tudor:**

It was a variety of products. We were selling a lot of accessories to RCA (/RCA\_(Radio\_Corporation\_of\_America))'s 16-mm motion picture business. We also manufactured radio receivers for a private label and anything that would come along.

## Contact by Texas Instruments

**Wolff:**

I see. That leads me to the Regency radio about which I am writing. It is my understanding that Texas Instruments (TI) was looking for someone to manufacture a radio with their transistors and that they were turned down by some manufacturers. Then Haggerty (/Patrick\_E\_Haggerty) saw an ad of yours and somebody met you at the Chicago Parts Show. Can you tell me how the meeting came about?

**Tudor:**

I don't know how they managed to get in touch with me, but it was at the Chicago Parts Show. At that time our big deals were television boosters, UHF converters and high fidelity equipment. They got in touch with me during the show and then I went down to visit Haggerty (/Patrick\_E\_Haggerty). I think it was the weekend of the Fourth of July in 1954. We had been in business at that point manufacturing under the Regency name but still with the I.D.E.A. company name since '47.

**Wolff:**

Let me go back a minute. Was it Haggerty (/Patrick\_E\_Haggerty) who met you at the Chicago Parts Show?

**Tudor:**

I met Buddy Harris at the Chicago Parts Show. I guess I didn't meet Haggerty (/Patrick\_E\_Haggerty) until later when I went to Dallas.

**Wolff:**

What do you remember Harris, or whoever it was, saying to you? Did they ask you whether you would be interested in manufacturing this radio?

**Tudor:**

Yes. It was pretty clear that they would furnish the transistors and we would finance the rest of it. Transistors amounted to about half the cost, so that was a pretty good deal.

**Wolff:**

Do you recall asking why they picked you? Do you know why they picked you?

**Tudor:**

No. I have no idea, and I don't recall whether or not I asked.

## Meeting in Texas

**Wolff:**

You had this contact with Harris and then went to Dallas and met with Haggerty (/Patrick\_E\_Haggerty). Is that correct?

**Tudor:**

Yes.

**Wolff:**

Was it just you?

**Tudor:**

I think my wife accompanied there. Haggerty (/Patrick\_E\_Haggerty) was having some kind of affair.

**Wolff:**

What was the purpose of that? Was it to sign papers?

**Tudor:**

No. It was just to get acquainted and see what it was he wanted done. The day after Haggerty (/Patrick\_E\_Haggerty)'s affair they showed me a six-transistor breadboard they had put together. It had six transistors plus a diode. The performance was pretty pathetic, but they thought they could improve the characteristics of the transistors. I agreed to take the prototype back and have our people take a look at it and see if they wanted to get involved. I did and we did, and in the ultimate design effort that took place we reduced it from six to four transistors, and reduced a lot of other parts, miniaturized it and packaged it up in the result we called the TR-1.

**Wolff:**

The thing that is a little confusing to me is that Dick Koch (/Oral-History:Richard\_Koch) remembers flying down to TI with Ray Morris and meeting Haggerty (/Patrick\_E\_Haggerty) and seeing the breadboard down there.

**Tudor:**

That perhaps is the way it worked. It could be. I am not too clear on that. I know that I was the first one to see it. Maybe I sent the people down there after that.

**Wolff:**

He says that around July 1st he sat down with Pat Haggerty (/Patrick\_E\_Haggerty), Roger Webster (/Oral-History:Roger\_Webster) and Ray Morris, who I guess was your chief engineer.

**Tudor:**

That would make sense. I would buy that.

**Wolff:**

You think you went down earlier?

**Tudor:**

Yes. Maybe it was not the Fourth of July. Maybe it was just some weekend that Haggerty (/Patrick\_E\_Haggerty) was having some of affair at his house.

**Wolff:**

I see.

**Tudor:**

I know it was shortly after the parts show, which was in late May, so it must have been in June sometime.

**Wolff:**

I think they mention that somewhere in the TI papers. Yes. At that convocation you attended a few years ago Haggerty (/Patrick\_E\_Haggerty) said, "In June 1954, after a whirlwind courtship, we entered into a joint program with Regency." You must have had a meeting with him and then later the other guys went down.

**Tudor:**

That's probably true. However we never signed any papers until months later. It was strictly a gentlemen's agreement.

## Challenges Facing the TR-1 Project

**Wolff:**

Once the project got going, what was the biggest problem you guys had from your standpoint? I know you had to get it on the market by Christmas.

**Tudor:**

If you have the transcript of that meeting in Texas then you have my speech.

**Wolff:**

Yes. Your speech was pretty short.

**Tudor:**

My speech was limited by the requirements. It was almost the exact number of words they requested.

**Wolff:**

I was just wondering what from your standpoint was the biggest problem that Regency had in the building of the radio (/Radio).

**Tudor:**

Exactly what was in those remarks. We were not limited to designing a radio (/Radio). We had to come up with a whole new line of components that did not yet exist. The bulk of the engineering effort was devoted towards that. After all, the super heterodyne radio (/Superheterodyne\_Receiver) has been around for a long time. There wasn't a hell of a lot we could do about that.

**Wolff:**

I was going to ask you to explain that. You said, "You may be surprised to know that the Regency radio triggered the miniature discrete components market."

**Tudor:**

It certainly did.

**Wolff:**

I wasn't sure what you meant by that.

**Tudor:**

Read the rest of the remarks.

**Wolff:**

You couldn't get the things you needed. Your biggest problem was to get those.

**Tudor:**

We actually started the industry, because there were no miniaturized IF transformers, there were no miniature tuning condensers or miniature electrolytics. Electrolytics are particularly low voltage and relatively high capacity. More important were the transistor circuits, because they are primarily current devices.

**Wolff:**

I see.

**Tudor:**

The result of the product being successful caused a lot of other people to go into that business.

**Wolff:**

I get it.

**Tudor:**

We had far, far more turndowns than we had people who were willing to work with us.

**Wolff:**

Good. That clarifies it.

**Tudor:**

Far and away the most serious problem was in getting a package together that would meet the requirements, which was small enough to fit into a shirt pocket.

## Prototype and Marketing Deadlines

**Wolff:**

Did you ever worry about whether Koch's (/Oral-History:Richard\_Koch) redesign would meet the deadline?

**Tudor:**

We all worked around the clock from that early July to late October to get the first ten prototypes built.

**Wolff:**

### Audio File

MP3 Audio

(462\_-\_tudor\_-\_clip\_1.mp3)

You had to furnish ten prototypes? **Tudor:** Yes. That was our program, to get ten prototypes by the end of October. We had to have enough pieces to prove the design and prove the spread of the transistors and receiver in hand-machined cases. Although they looked like the subsequent molded units, the cases were all made by hand — as were the circuit boards and the chassis. The components were as ultimately used. **Wolff:** Koch had the sense that you were nervous about whether he would make the deadline or not, and I was wondering if you remembered that. **Tudor:** No. As I say, we all worked around the clock. It was an arbitrary deadline. It was one that we picked ourselves. If we could get the prototypes done by the end of October then we could have the unit tooled and into production for the Christmas market. **Wolff:** The Christmas market was not an arbitrary deadline, was it? **Tudor:** Yes. To have the thing tooled and in production for the Christmas market. As it turned out we only opened two markets, New York and Los Angeles. **Wolff:** I thought TI demanded of you that they be ready for the Christmas market. **Tudor:** Oh no. I think we mutually agreed to it, but I don't recall anything at all pervading about that. **Wolff:** I see. **Tudor:** If we were going to make the Christmas market by whatever means, the design had to be finalized by the end of October. It could not be finalized unless we had a number of prototypes. **Wolff:** I understand that, but I just wanted to be sure that the requirement on you was not TI telling you, "We must make the Christmas market." That was something upon which you mutually agreed. **Tudor:** Yes. **Wolff:** That's interesting. **Tudor:** Why is that interesting? **Wolff:** I had the impression that they felt they had to get onto the Christmas market and that was one of the requirements of the job. **Tudor:** I have forgotten the exact timing of our announcement. **Wolff:** You did make that deadline. **Tudor:** I don't recall that as being any kind of an all-pervading thing. It could have been. Mind you this is thirty years later. **Wolff:** Yes. I realize that. It also said in there that the coordination between TI and Regency was mainly handled by Buddy Harris. How did that work? **Tudor:** Quite well. He was at our place quite often. **Wolff:** Was he just monitoring your progress? **Tudor:** In effect. A lot of other people were involved too. There was a great deal of travel back and forth. Of course the bulk of the work was being done at our place. I was just going through an old engineering log that I hadn't realized I had. I started looking through the file in anticipation of this interview. Besides Webster and Harris there were a whole bunch of people from TI up and back.

## Sales of Transistorized Radios

**Wolff:**

How would you describe the impact on Regency of coming out with this radio? Was it a major product of yours or was it just a small piece of what you were doing?

**Tudor:**

Oh no, of course not. It was a major product very definitely. And it got us worthwhile publicity, so the impact certainly had to be great.

**Wolff:**

In terms of finances, was it 50% of your sales or closer to 90%?

**Tudor:**

It was a high percentage. I would say it was greater than 50%, but I do not recall what it was relative to the other products.

**Wolff:**

We could say that it was more than 50% of your sales. For how long did you produce? I know you had a couple of models. Do you remember?

**Tudor:**

For quite a few years. We got up to at least the TR-6 model, which was the last model down the road, plus a couple of alphabetical variations in between TR-1 and TR-6. I looked through some old literature to see if I could find any dates, but I didn't see any. All I can say is we were making transistor radios for at least five or six years.

**Wolff:**

For those five or six years was it half your sales?

**Tudor:**

I would say it was, yes. That would be a reasonable estimate.

**Wolff:**

Why did you get out of the business? Why did you stop making them?

**Tudor:**

I don't believe we stopped making them while I was there.

**Wolff:**

You had left Regency?

**Tudor:**

Yes. I left in the late '50s or early '60s.

**Wolff:**

Were they still making them when you left?

**Tudor:**

I don't know. We did have terrific competition from the Japanese.

## Ray Morris and Secrecy of TR-1 Project

**Wolff:**

Is there anything else you want to mention that I didn't ask about?

**Tudor:**

Were you aware that this was on the cover of the *Proceedings* in the December issue of that year?

**Wolff:**

Yes.

**Tudor:**

I can't recall whether there was an article with that.

**Wolff:**

There was a tiny article. I have that.

**Tudor:**

Okay. No, I can't think of anything else. If you need any more information, feel free to call me.

**Wolff:**

Okay. I'll do that. Just one question. It would be nice to talk to Ray Morris. Do you know his whereabouts? No one else seems to know.

**Tudor:**

The last I heard, Ray left and became a very successful manufacturer's rep in the Indiana-Kentucky area. It was under the name Morris Cunningham. If you'll hang on for just a minute I can look in the current rep directory and see if they're still [unintelligible word].

**Wolff:**

Oh good. Thank you. [...recorder turned off, then back on...] You say Koch (/Oral-History:Richard\_Koch) was your leading genius.

**Tudor:**

Oh yes. He was the engineering brain of the place. Everybody else came to him with their problems.

**Wolff:**

Okay.

**Tudor:**

Ray Morris was trying to stimulate Dick Koch (/Oral-History:Richard\_Koch) to get going on this [unintelligible phrase] doing it.

**Wolff:**

I see.

**Tudor:**

I'm sure he could give you a better story on that, because I didn't even know the incident ever occurred.

**Wolff:**

If we can find him, we will. Thanks very much and thank you for your time. It was very helpful to talk with you.

**Tudor:**

I'll certainly let you know, Michael. I hope everything works out all right with your article.

**Wolff:**

Thank you. Bye. [...Wolff's voice continues after the phone has hung up...] We were asking Tudor about the incident on the airplane that Koch (/Oral-History:Richard\_Koch) told me about where Ray Morris kept it a secret and then when they got on the airplane he told him, "Well, this is really what we are going to do. We are going to Texas to build this radio for TI," and Tudor's response was, "Oh, well that's the way Morris liked to dramatize things. That was his style and that's how he stimulated interest." But Tudor had not known of that until now. All right, that's the end of the interview with Ed Tudor on January 29, 1985.

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