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HP AppCAD - A Software Collection for Calculating Microwave Exercises

The keen response to my description of the CAD software "Puff" (1) encouraged me to take note of a further PC program which is interesting and helpful: HP AppCAD.

HP AppCAD comes on three 360K diskettes, which contain a comprehensive selection of HP semiconductor data and calculation programs for commonly-occurring microwave problems.

Fig. 1 shows the main menu. As you move the cursor on the left-hand side of the screen from line to line, a brief description appears on the right (Fig.2).

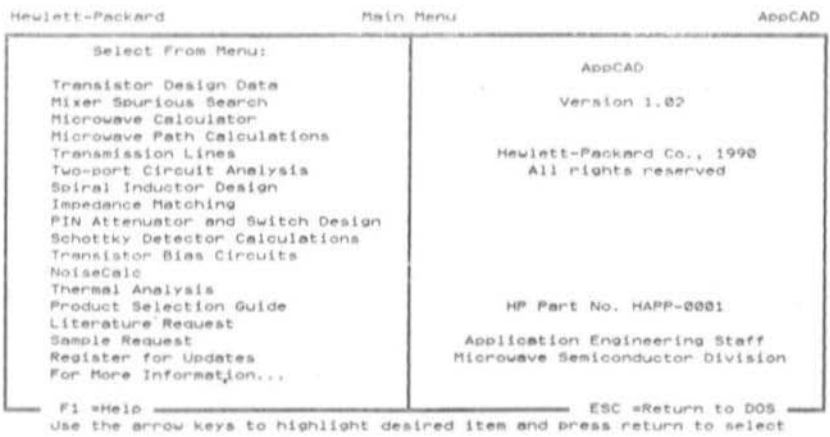

Fig.1

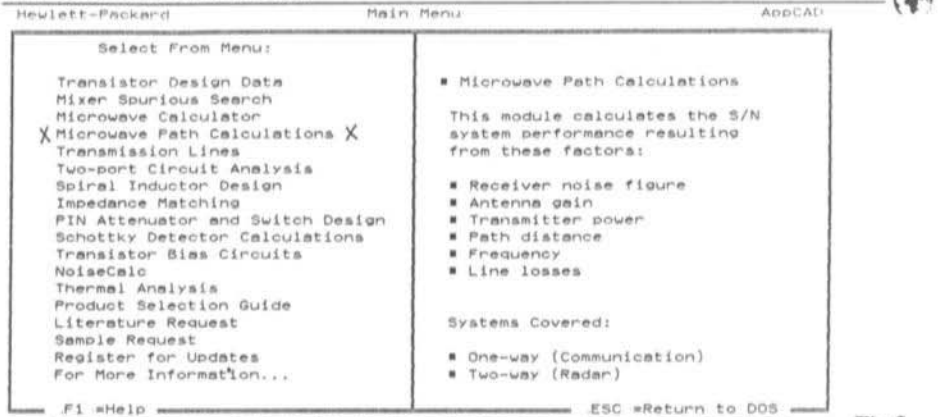

Fig.2

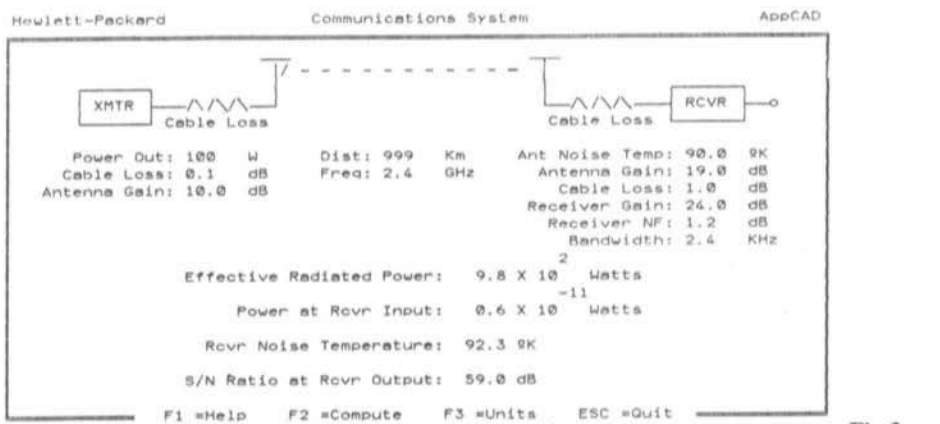

Fig.3

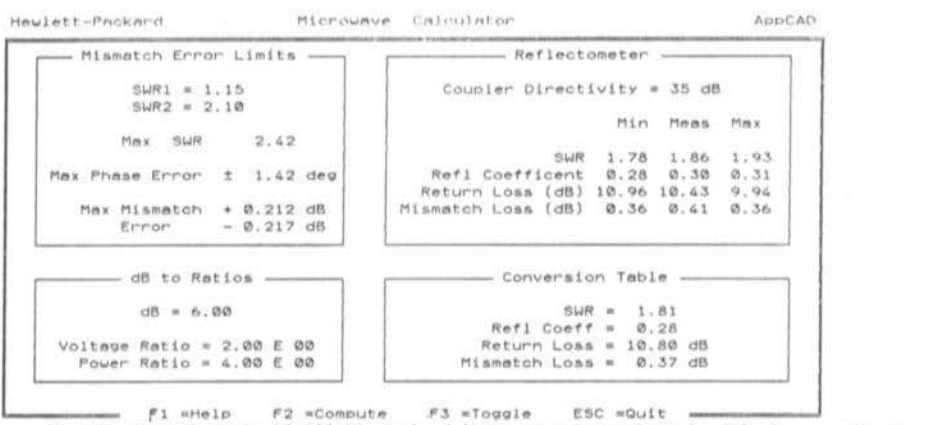

Fig.4

Fig.5

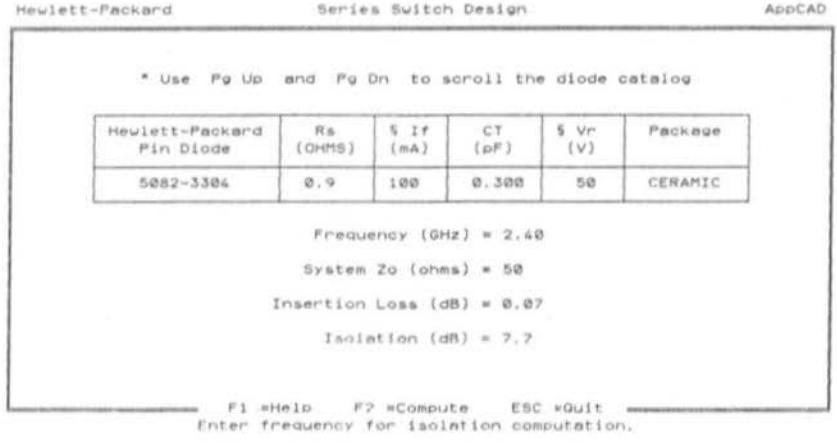

Fig.6

Fig.7

After clicking there then appears, for example, a circuit of a communication system with characteristic data, of which one can enter one or more data and the rest is then calculated by pressing F2 (Fig.3). This happens in a twinkling!

Pressing F1 causes explanatory text to appear, with F3 you can change units - for instance between km, nmi and smi, or between kHz, MHz and GHz, or between mils and micrometres.

In the communication system in Fig.3 it happens that a maximum distance of only 999km can be entered. Anyone wishing to calculate satellite path distances will have to double the distance several times and use some mental arithmetic (2).

The "Microwave Calculator" (Fig.4) comprises four independent modules for calculating or recalculating commonly used values.

Clicking "PIN Attenuator and Switch Design" involves more effort. With the brief explanation pops up a selection window (Fig.5); clicking on "Series Switch" brings up a brief data sheet from which you can turn up the appropriate PIN diode from the HP

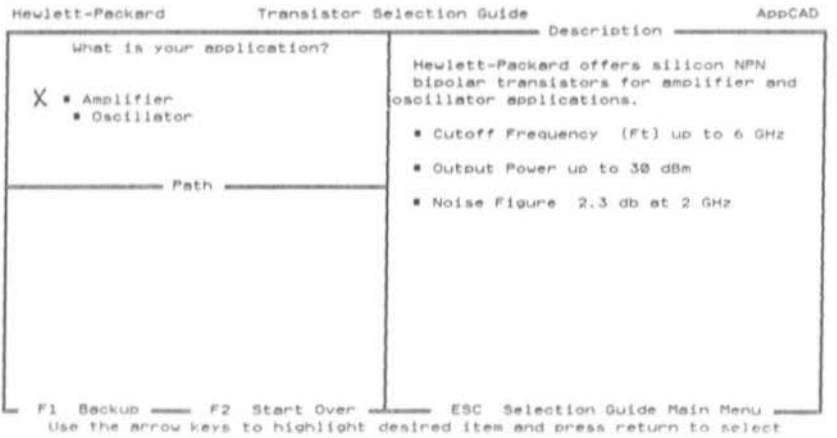

Fig.8

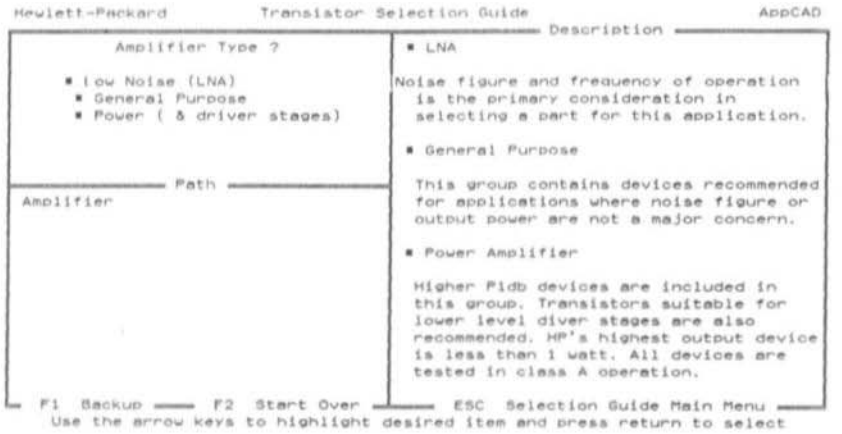

Fig.9

Fig.10

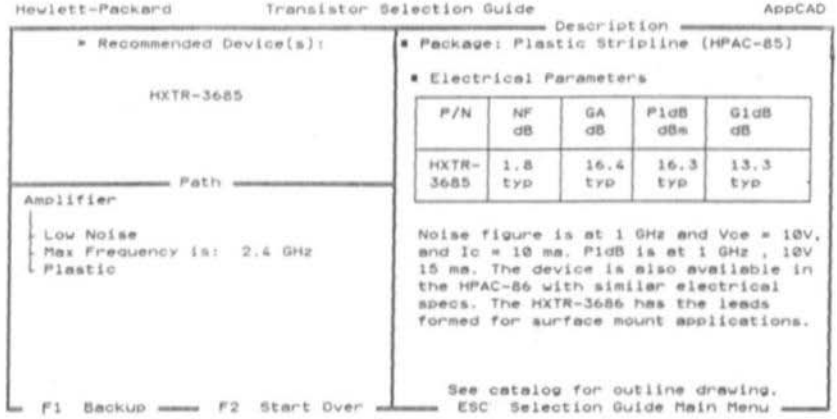

Fig.11

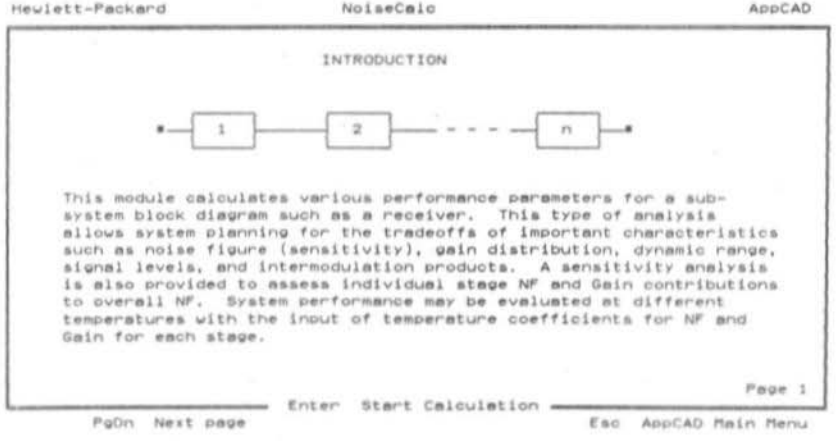

Fig.12

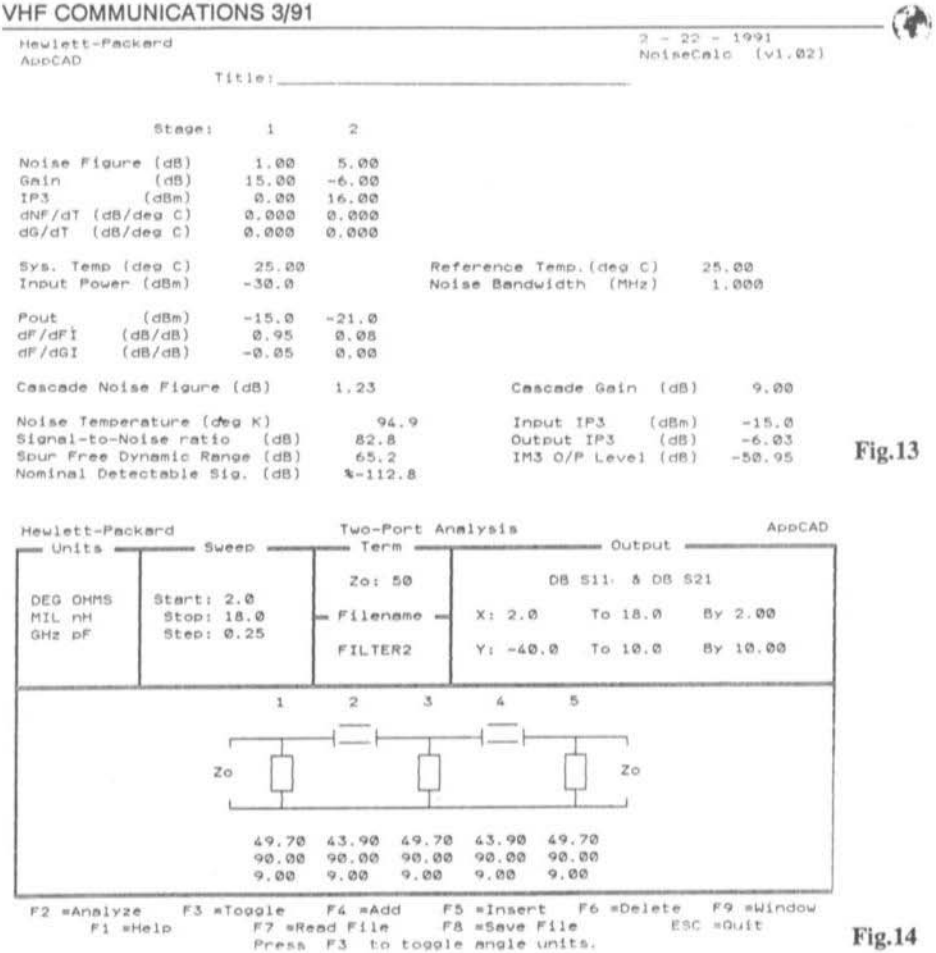

Fig.13

Fig.14

catalogue (Fig.6). After entering the working frequency and the impedance, the appropriate insertion and isolation attenuation values appear.

Much more comprehensive is the "Product Selection Guide". Here the choice is very broad (Fig.7) and after clicking you are led down a route (Figs.8, 9, 10) until finally one or more semiconductors for the frequency entered appear with their short-form data (Fig.11).

I printed out figures 1 to 12 using "Print Screen"; there are, however, also a pair of modules which contain their own print option. So for example the "Noise Calculation" (Fig.12): using F5 you can print out the calculation sheet with the values entered and the results calculated (Fig.13).

The module "Two-port Circuit Analysis" permits the analysis of linear circuits with concentric or distributed circuit elements, which can be chosen from a pop-up menu. In addition data of S parameters in Touchstone format can be entered as a circuit element. For the dipole - (Fig.14) shows one of two permanently installed examples - after matching the values and units or even altering the

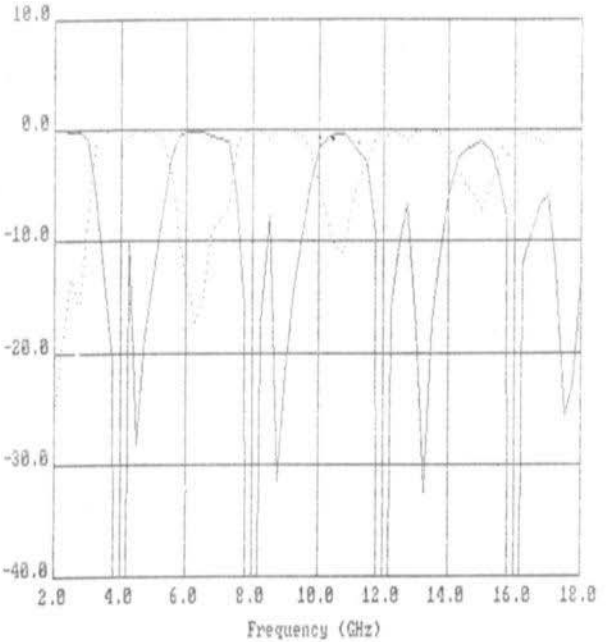

Fig.15

dipole itself, you can work out the values of S11 and S21 over the (fixed) range of 2 to 18GHz and print this in graphic form on paper using an Epson-compatible printer (Fig.15).

With this I have certainly not described all that HP AppCAD can do but at least a profile of it. It is probably clear that you need a good technical grounding: in my opinion, while the help files give useful assistance, they are no substitute for textbooks and reading. For printed circles (Spiral Inductor Design) recourse will definitely need to be made to an American textbook.

On the other hand, the selection of HP semiconductors offered is an up-to-date method of reference in a databook, which every interested person can use immediately. In addition the semiconductor S parameter data provided in Touchstone format (one complete floppy full) can be used in CAD programs. To use them in the program Puff a conversion utility is needed, which Klaus-Juergen Schoepf DB3TB has made available.

LITERATURE

(1) Robert E. Lentz, DL3WR: Puff - A CAD program for microwave stripline circuits VHF COMMUNICATIONS 23 (1991), pp 66-68.

Follow-up to the article 'PUFF - a CAD Program for Microwave Stripline Circuits'

The editor and publisher would like to thank readers for the many letters they received advising other CAD software programs. As soon as these come down to an amateur price level, we will mention them.