Book Review - 119 Practical Programs for the TRS-80 Pocket Computer

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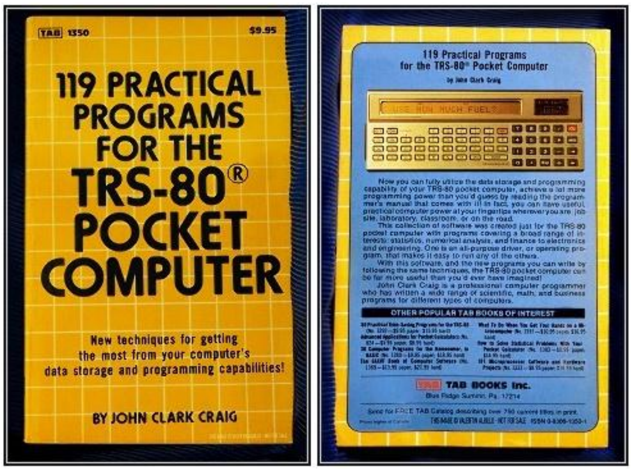
1. Introduction

This is my review of the book ***"119 Practical Programs for the TRS-80 Pocket Computer"*** by John Clark Craig, a compendium of short *BASIC* programs (less than 20 lines of code) for the title pocket computer, equally valid for the *SHARP* models *PC-1210* (some of the longer programs may not fit due to memory limitations), *PC-1211* (the title *TRS-80* model is an identical rebranded clone of this original *SHARP* model, down to the yellow LCD display) and *PC-1212* (same model but with a more standard grey LCD display replacing the original yellow one). First of all, the essential data for the book:

Element	Value
Title	119 PRACTICAL PROGRAMS FOR THE TRS-80 POCKET COMPUTER
Author	Craig, John Clark
Publisher	TAB BOOKS Inc.
Copyright	Copyright © 1982 by TAB BOOKS Inc.
Subjects	TRS-80 (Computer)—Programming.
	Computer programs.
Applies to	TRS-80 Pocket Computer, SHARP PC-1210, PC-1211, PC-1212
Pages	298
ISBN	0-8306-1350-1
Covers	 TAB 1350 $9.95 119 PRACTICAL PROGRAMS FOR THE TRS-80® POCKET COMPUTER New techniques for getting the most from your computer's data storage and programming capabilities! BY JOHN CLARK CRAIG 119 Practical Programs for the TRS-80® Pocket Computer by John Clark Craig OTHER POPULAR TAB BOOKS OF INTEREST TAB BOOKS Inc.

The book features a sizable collection of short *BASIC* programs (118 plus a driver program) covering an extensive number of topics in Engineering, Math, Numerical Analysis, Statistics, Finance, etc., even Games (six are included), all of them listed in ***2. Contents*** below. For each program the following sections are included:

- Full description and relevant formulas
- Examples
- Formatted listing (one statement per printed line) and program length in steps (bytes).

2. Contents

2.1. Programs included.

The following table shows all 118 programs featured in the book, ordered by name and grouped by subject:

Bernoulli Numbers	Distribution— Binomial	Histogram Bins	PI—by Dartboard
Bessel Functions	Distribution— Hypergeometric	Hyperbolic Functions	Plotting—Three Dimensions
Black Holes	Distribution— Normal	Integrals— Cosine Integral	Pocketext
Boolean Logic Truth Table	Distribution— Poisson	Integrals— Exponential Integral	Pocket Alarm Clock
Calendar— Date	Electronics— Balanced Bridge	Integrals— Sine Integral	Pocket Watch
Calendar— Easter	Electronics— Decibels	Integration— Gaussian Quadrature	Polar to Rectangular
Calendar— Moon	Electronics— Ohm's Law	Integration— Simpson's Rule	Polygon Area by Walkaround
Calendar—Subroutines	Electronics— RC Timing	Integration— Weddle's Rule	Polygons—Regular
Calendar—Two Dates	Electronics—Resistor Analysis	Interpolation— Lagrange	Prime Numbers
Checkbook	Electronics—ResonantFrequen	Interpolation— Linear	Quadratic Equations
Chi-Square	Error Function & Complement	Least Common Multiple	Radioisotope Activity
Circle Determined by 3 Pts	Euler Function	Limit of a Function	Random Numbers —Exp Distribution
Combinations	Euler Numbers	Line Analysis	Random Numbers— Integers from I to J
Complex Number Functions	Exp (X) for Large X	Loan	Random Numbers—Normal Distribution
Complex Numbers— Simultaneous Equations 2x2	Factorial—Three Versions	Logarithms to Any Base	Random Numbers—Reals from A to B
Coordinate Systems for 3 D	Factors of a Positive Integer	Matrix Inversion NxN	Rectangular to Polar
Coordinate Translation/Rotat	Fibonacci Number	Mean & Standard Dev—Grouped Data	Relativity
Cubic Equations	Flash Cards—Multiplic. Table	Mean & Standard Dev— Ungrouped Data	Simultaneous Equations—Size Two
Curve Fit— Exponential	Fractions	Means—Arithmetic, Geom. and Harmonic	Simultaneous Equations—Size Three
Curve Fit—Geometric	Games-"Deal 'em"	Metric Conversions	Simultaneous Equations—Flexible Size
Curve Fit— Linear	Games-"Huh?"	Miles Per Gallon	Spherical Triangles
Curve Fit— Logarithmic	Games—"Lunar Landing"	Miles Per Hour	Temperature Conversions
Curve Fit— Multiple Linear Regression	Games- "Numb"	Moving Average	Triangle Analysis
Curve Fit— Parabolic	Games-"Pool"	Number Conversions— Bin to Decimal	Triangles—in Space
Decimal to Fraction Conv.	Games-"Wug Hunt"	Number Conversions— Decimal to Bin	Vectors (9 functions)
Derivatives of a Function	Gamma Function	Number Conversions— Dec to Hex	Volume—Defined by 4 Cartesian Space Points
Determinant—2x2 Matrix	Graphing Helper— Creating a Nice Axis	Number Conversions— Dec to Octal	Wind Chill Index
Determinant—3x3 Matrix	Graphing Helper— Plotting a Function	Number Conversions— Hex to Dec	Zero of a Function
Dice Thrower	Greatest Common Divisor	Number Conversions— Octal to Dec	
Differential Equations	Gudermannian Func & Inverse	Permutations	

There are groups for *Calendar* (5 programs), *Curve Fit* (6), *Distributions* (4), *Electronics* (6), *Games* (6), *Graphing Helper* (2), *Integrals* (3), *Integration* (3), *Interpolation* (2), *Mean and Standard Deviation* (2), *Number Conversions* (6), *Random Numbers* (4) and *Simultaneous Equations* (3), plus 66 additional ungrouped programs.

The sheer number of programs included is to be commended and many of them will prove useful to beginners, especially to *learn programming by example* in this particular *BASIC* version, and also to use them *as-is* or eventually modified to suit them to your particular needs, or even using them as a basis for further enhancement. For more advanced users the programs might fall a little flat as they're quite simple and mostly quite short as well. Matter of fact, among the shortest you'll find the following ones:

Program's name	Lines of code	Steps (bytes)
Determinant – 2x2 Matrix	1	26
Combinations	3	71
Chi-Square	3	76
Bernoulli numbers	4	97

while among the longest you'll find these, not very long, mind you, but not trivial either:

Program's name	Lines of code	Steps (bytes)
Loans	17	528
Matrix Inversion NxN	15	528
Spherical Triangles	19	542
Vectors (9 functions)	17	565

A good feature of the book is that, besides self-contained programs, it also includes some useful *generic subroutines* that are called from a number of programs and can potentially be called as well from programs you write yourself. That's the case with the ***DJ***, ***JD*** subroutines *(10 lines, 303 steps)*, described in the book like this:

> *"These subroutines are used by several calendar-related programs in this book.*
>
> > ***DJ*** *— Converts a date expressed as month, day, and year in variables M, D, and Y to the equivalent astronomical Julian day number. This day number is returned in variable J.*
> >
> > ***JD*** *— Converts an astronomical Julian day number in variable J to the equivalent month, day, and year for that date. Variables M, D, and Y are returned with these values.*
>
> *Both subroutines also return the day of the week in variable W. 0 for Sunday, 1 for Monday, and so on through 6 for Saturday."*

As can be seen, their inputs and outputs are clearly stated to help you call them from your own programs. The programs in the book that call them are calendar-related, for instance the ***Calendar – Easter*** program, described like this in the book (the bold and underlining are mine):

> *"This program computes the date of Easter for a given year. The range of accuracy is from the year 1583 to the year 3999. You must also load the calendar subroutines* ***DJ*** *and* ***JD*** *for the program to work correctly."*

which clearly indicates the use of the subroutines. By the way, when also taking into account their length, the ***Calendar – Easter*** program is 602 bytes long in all, probably the longest in the book.

2.2. Other sections

The book also includes ***Introduction*** and ***Acknowledgments*** sections, the latter featuring the following amusing statement which mentions two popular *Hewlett-Packard* pen plotters used to very good effect:

> *“Most of the illustrations in this book were drawn by some android friends of mine,* ***HP9825A*** *and* ***HP9872A****. Thank you both for your after-hours help.”*

and this is a sample plotted illustration for the ***Boolean Logic Truth Table*** program, taken from the book:

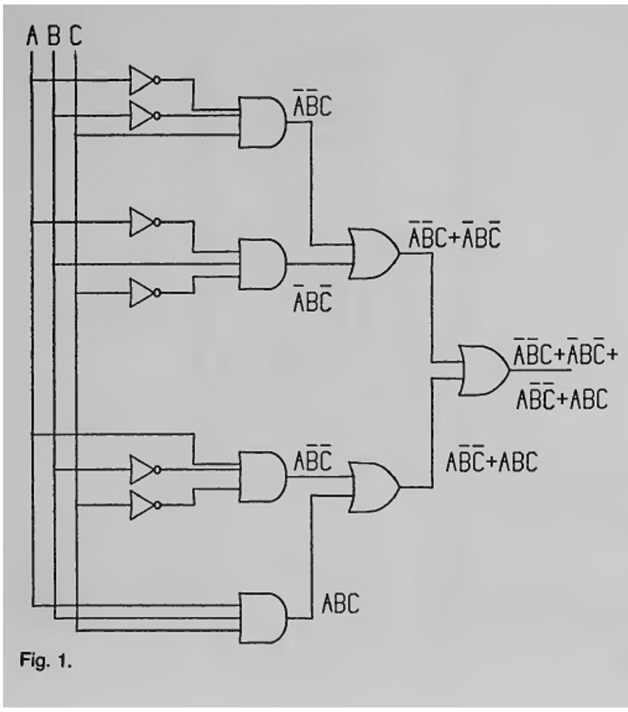
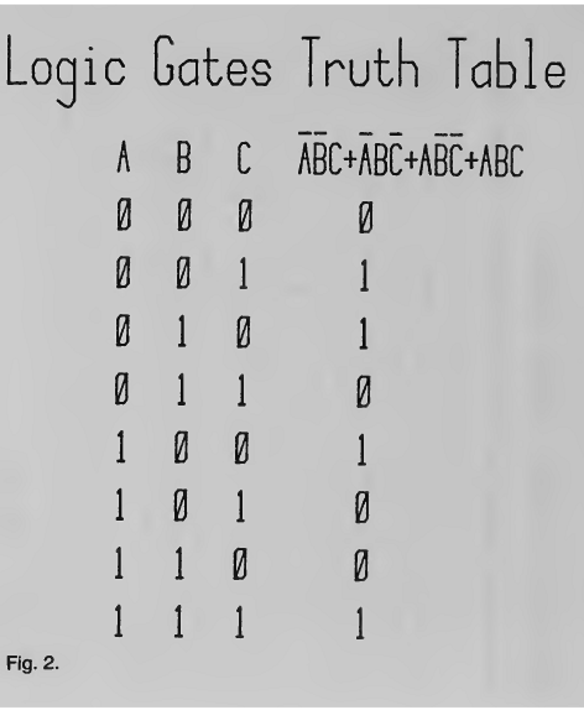


Fig. 1.



Logic Gates Truth Table

A	B	C	$\bar{A}\bar{B}C+\bar{A}B\bar{C}+A\bar{B}\bar{C}+ABC$
Ø	Ø	Ø	Ø
Ø	Ø	1	1
Ø	1	Ø	1
Ø	1	1	Ø
1	Ø	Ø	1
1	Ø	1	Ø
1	1	Ø	Ø
1	1	1	1

Fig. 2.

Another section is dedicated to the ***All-Purpose Driver***^{TM} program, which is described somewhat bombastically saying it *“acts as an operating system for BASIC”*, and then using almost 50 lines of text to describe it. Actually, it’s just a most trivial 2-line, 4-statement launcher which simply inputs the name of the program to run and goes to it, then the called program is supposed to include a go-to back to this launcher upon termination. That’s all.

Much more interesting and useful are the two ***Appendices*** and the ***Index***. The latter is ordered alphabetically by subject and lists the page numbers of the various pages where each subject is dealt with, while the former are:

Appendix A - TRS-80 Pocket Computer Reserved Words

This *Appendix* includes a table with all the reserved *BASIC* words available, 48 in all, in this format:

Reserved word	Shortest abbreviation allowed	Description
ABS	AB.	Absolute value
ACS	AC.	Inverse cosine
AREAD	A.	Data input
...	...	...

which is particularly useful to consult whether a given keyword is available and its exact spelling, as well as the shortest abbreviation to use it, which can save keystrokes and time (such as simply **A.** to specify **AREAD**, or **I.** to specify **INPUT**, three keystrokes saved in both cases).

It also includes an illustration of the keyboard with all important keys and key sections located and described, as well as a list of all displayable symbols (again 48 in all) and the key sequence used to display each (such as the sequence SHFT ▲ to display π).

Appendix B - Translating to Another BASIC

Another very useful *Appendix* which doubles the value of the 118 programs included in the book by giving 9 useful hints to help translating them to run in other computers which use a different version of *BASIC*. A thoroughly detailed worked example is given.

Besides these hints, the subsection titled *"Alternate Definitions for a few TRS-80 Pocket Computer Functions"* includes a table with several examples of coding in *Standard BASIC* and useful tips including angle conversions from/to radians/sexagesimal degress, boolean constructs for **IF**, deconstructing multi-statement lines into several lines for *BASIC* versions which don't support multiple statements on a line, etc.

All in all, a great way to expand the appeal and usefulness of this book for systems other than the one in the title.

3. Conclusion

I find this book quite helpful and the best I've seen of its kind. It includes many programs of all types, so you're bound to find a number of them which are actually useful to you for your own needs, and if you're a beginner or have never programmed these particular pocket computers *(TRS-80 PC-1, SHARP PC-1210, 1211, 1212)* then all of them will be useful as working examples from which to learn proper syntax and a few tricks.

The programs themselves aren't too complex but many of them aren't trivial either and at 8 cents per program it's a real bargain. All of them are adequately documented, including an example, many relevant plotter-produced illustrations which greatly help understanding, and a formatted listing so that multi-statement lines are listed at just the one statement per printed line, which does wonders for clarity. Also, the programs are quite compact and efficiently written to save as much valuable *RAM* as possible while taking care to preserve readability. The book even gives additional hints for the user to compact them further if desired by taking advantage of non-standard peculiarities of this particular *BASIC* version, such as saving steps (bytes) by leaving final parentheses unclosed, which is legal, and so on and so forth.

Finally, both *Appendices* are quite useful, most especially the last one, which gives good tips to convert the programs to other versions of *BASIC*, which is not as trivial as it might seem because the *BASIC* version used here has many shortcomings and peculiarities as compared to other more standard versions such as *ANSI BASIC*, *MS BASIC*, *BASICA*, etc. The explanation is rounded up with a fully worked example (2+ pages), converting a particular program from the book ***(Prime Numbers)*** to a more standard *BASIC*.

All in all, a worthy, comprehensive collection of programs and very good value for money. I wish I had this book when I first got my *SHARP PC-1211* pocket computer when it was released back in the very early 80's, and even now it makes for a fine collectible and an interesting read.

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