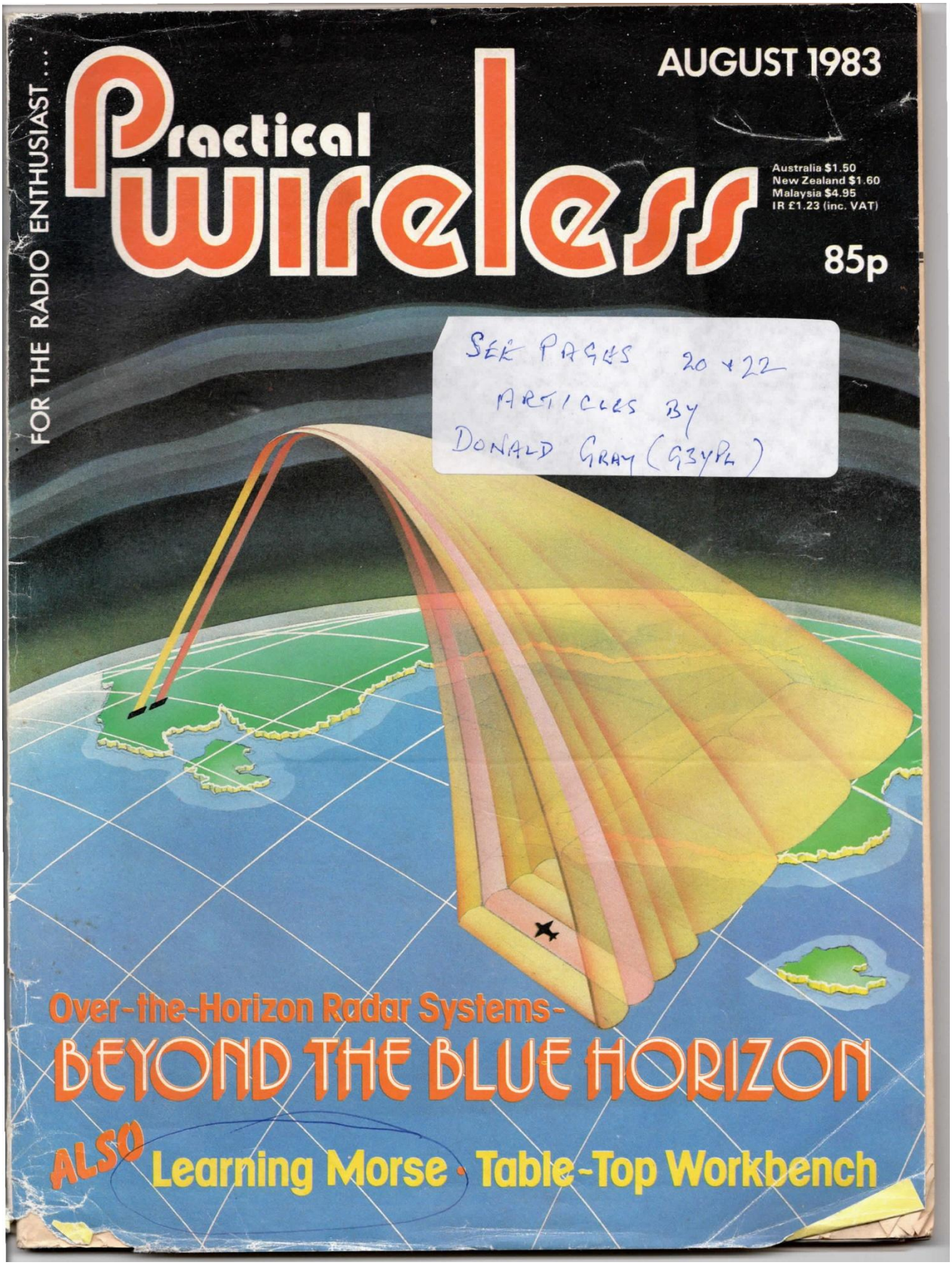
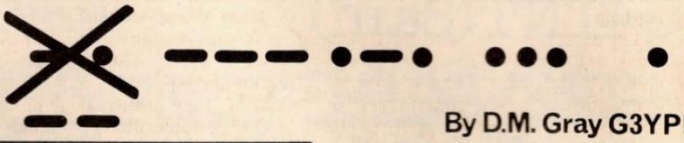
Magazine Cover



LEARNING MORSE



By D.M. Gray G3YPL

QUESTION?

How did we learn most of the skills we now have? How did we learn to speak, to walk, to write, to ride a motorbike or drive a car?

ANSWER:

Proficient Teachers, Practice and **Practical Experience**

How do we learn Morse? The answer must surely be as above.

THE PROFESSIONAL OPERATOR

● The professional operator, when being trained, is allocated several hours per day, dedicated to the task of learning Morse.

● Firstly he will listen to the Morse being sent—usually learning just four or five letters at a time.

Once he has learnt the characters, albeit at slow speed, **he will then be taught to send Morse**—again at slow speed. This way he learns to form the Morse symbol correctly and becomes thoroughly familiar with the sending key. He will also be taught figures and punctuation during this initial learning period. It is much easier to get the learning over and done with than return to it later.

Although he will be practising his sending only approximately 10 per cent of the time—it is a very important and integral part of the learning process.

● From the earliest opportunity, the professional operator is practising his sending and gaining practical experience at the same time.

● Every so often, perhaps once or twice a week, he will have a 2 minute or sometimes 9 minute speed test—at a speed of at least 2 words per minute **slower** than practice speed.

● These tests are designed to find out which letters, figures or punctuation marks, if any, he is experiencing difficulty with.

● For example, he could be confusing "F" for "L" or "A" for "N", "S" for "H" etc. If this does occur, he is given specially structured tracts of Morse to listen to and practise with, which will emphasise the problematical characters, thereby helping him to overcome these problems quickly.

● The method of achieving reasonable speed in receiving and sending Morse can be summed up in a single but often misunderstood word: "practice" the right sort of practice.

● It may help to be more specific on this point because if the learning process is to be understood, it will become obvious why it is essential that: "less than 100 per cent copy is desirable and conversely 100 per cent copy is undesirable".

This may sound paradoxical but the reason for this is to make your brain react a little faster than it normally does!—this reaction must also be a subconscious one.

For example:

If you can copy 75 per cent of Morse at, say, 15 w.p.m. you may feel demoralised at missing 25 per cent of it. In reality, however, by trying to copy 100 per cent and achieving 75 per cent you have subconsciously taught your brain to react just that little bit faster.

Conversely, if you can copy 100 per cent of what is sent, say at 10 w.p.m.—you get that "good for the ego" feeling of success, and that is all you have done—boosted your ego, not increased your speed. (Ego boosting is also part of the learning process with Morse.)

● When the ears detect the sound of a Morse symbol, the brain has to literally translate this sound into a physical action such as writing the appropriate letter onto paper. Eventually, with enough practice, this action becomes second nature and you no longer have to concentrate so hard on listening and writing.

● When just starting to learn Morse, there is quite a lengthy "thinking" time whilst the translating is going on. The main task is to reduce this "thinking" time to a minimum, and then to eliminate it by letting the subconscious do the translating.

● To sum up, the professional operator is taught Morse under more or less ideal conditions. I was taught Morse under these conditions in HM Forces—in 14 weeks I was working at 20 w.p.m. and tests at 18 w.p.m.

THE AMATEUR OPERATOR

The amateur operator has a fairly tough task, which requires a large amount of self discipline, dedication and patience. Usually you will be learning in conditions far from ideal—often on your own and perhaps with very little guidance.

● You are tired after a day's work and the brain is not reacting as it should. Maybe you have only 30 minutes to give today (last time it was 15 minutes—2 weeks ago!)

● Your local radio club may help (not all clubs give Morse tuition) but that is limited to maybe an hour a week.

There are always the RSGB Slow Morse Transmissions—these are very helpful for learning to receive—but no help at all for sending practice **and correcting any sending faults.**

THE ALTERNATIVES

If you have an "A" class licensee friend, maybe you can enlist his or her help.

Let us assume that you have been lucky and found a G2–3–4 who can **give** you their **time**—and it does require quite a heavy commitment of time by the teacher as well as the pupil. You only have to learn Morse once—they may have taught many others before you!!

Don't forget either they will have to come round to your place, or you to theirs. Whichever way it is—it is a disruption to home life whilst you both secrete yourselves away for a "C.W." session. Finding a relatively quiet corner in either house can also prove difficult.

However, with a pupil : teacher ratio of 1:1 this would be just about ideal. With plenty of time for both receiving and sending in a ratio of approximately 90:10. In fact, **time is of the essence.**

To achieve speeds of 12–15 w.p.m. a considerable amount of time **must** be devoted to the task.

The problem is time!

Time (when)
Time (how long)
Time (how often)

All these factors to the amateur are variable and **limited.**

You would be a lucky and rare person indeed if you could devote all your spare time to the hobby. However, the car needs attention—the XYL wants the kitchen shelves put up—junior op. wants his bike mended—boss wants that urgent report—garden needs weeding—garage needs tidying up—dog needs a walk—**and you still have to find time to learn Morse—when?**

When you can—the odd half hour here or there. The problem is that although these "odd" half hours soon add up, they are irregular in arriving and they don't often give much warning either.

When they do come—is your teacher available at such short notice? Maybe he also has shelves to put up, bikes to mend, gardens to weed, a dog to walk or even a rig to try to use! Travelling between the two homes can often take up much of the spare half-hour, too.

What do **you** do with the odd half hour? In the shack no doubt and on the air!

Just think of it—wouldn't it be great if there were just a few kHz on 144MHz (say 100–150kHz in the "multimode" section) where **Class "B"** licensees could receive and **send** Morse with Class "A" **and** "B" licensees. Perhaps using F2 mode (telegraphy by on-off keying of a frequency modulating audio frequency, or on-off keying of a frequency modulated emission)—maybe no more than 5 watts or so.

Yes—just think about all the advantages there would be:

1 It would encourage Class "A" licensees to be more active on 144MHz with Morse. (I have spent many hours calling CQ in Morse on 144·050 with only 4 contacts in 2 years!)
I for one would be only too pleased to send to, and listen to, slow Morse from a learner during my "odd" half hour.
2 It would be well within the spirit of amateur radio in as much as "part of the self training of the licensee in communication by wireless telegraphy" (*sic*).
3 144MHz because more Class "B" licensees have equipment for this band than for the h.f. bands. Radio amateurs in the UK have sole usership of the 144MHz band, too.
4 F2 Mode because I would estimate 99·9 per cent of Class "B" licensees have at least f.m. receive and transmit (even the ubiquitous "hand held" with a "rubber duckie" can be used in F2 mode).
To send F2 all you need to do is use an audio oscillator coupled into the microphone circuit (the tone burst for access to repeaters is in fact F2 mode!). The receivers require no modification at all.
5 Low power—because the intention is as defined in para. 2 and not for DX chasing!
6 The rate of converting from Class B to Class A would be increased.
7 The Class B licensee would have the opportunity to **practise** by sending **when** he can—on air—with others invoking a kindred spirit of self help.
8 It would complement and supplement existing slow Morse transmissions.

DISADVANTAGES

(i) There are likely to be some awful squeaks and hisses and some of the grottiest Morse anyone had ever heard!
(a) firstly, confining within 100–150kHz should help to eliminate interference to other users.
(b) secondly, lowish power should contain the "noises" geographically.

(ii) **It is illegal!!**

Really it does not appear to make sense that it is illegal. After all is said and done—the new schedule from the Home Office states in Section "D" of the footnotes, "Data transmission may be used within the band 144–145MHz and above, provided:

(a) the station call sign is announced in Morse or telephony once every 15 minutes.
(b) the emission is contained within the band width normally used with telephony.

A literal interpretation of this footnote would suggest that the Class B licensee can identify his data transmissions in **Morse** as an alternative to voice!—but I'm sure that is not the intention nor is it my intention to suggest "splitting hairs on technicalities".

If a Class B licensee is not permitted to send Morse "live" and "on air" on 144MHz, an analogy would be to say that a learner driver is not allowed to drive a car on any public road until he has passed his test! Or a non-swimmer is not allowed to go to public swimming places until he can prove his proficiency in swimming!

I am not advocating the initiating of a "novice" licence but a piece of practical help.

"Please Mister Home Office—can you help? Please may the B licensees use Morse for practice?"

G3YPL

PW RADIO PROGRAMS-2

STRUCTURED MORSE LEARNING COURSE

ZX81+16K

by D.M. Gray G3YPL

The concept of a Structured Morse Learning Course grew from a simple request by a G6 for a random Morse program to run on a low-cost microcomputer. In writing the program presented on the *PW* Radio Programs-2 cassette I have drawn on the methods used in my own training and incorporated these into the program. I was lucky in that I was taught Morse professionally and as well as being paid to learn I was given the daytime for my lessons.

The program concept takes into account that the student need **not** have prior knowledge or experience of Morse. Some Morse teaching devices and programs rely on the student knowing the Morse code, albeit at about 2w.p.m.

Unless the "tutor" not only sends the Morse symbol but **also** displays, or "tells", the student what has been sent, **and** does so **immediately after** sending the character, **it does not teach Morse.** It does, however, help to increase speed proficiency.

Even those "tutor" devices or programs which do tell the student what has been sent are limited in as much as:

Most of them teach the whole alphabet in one go, sending randomly any one of the 26 letters, or all the numbers, etc.

Learning Morse is a matter of **repeatedly** listening to a symbol—most "tutors" and programs do not repeatedly send the same symbol other than one chance in 26 (multiplied by the random factor of its software).

Most do not teach amateur punctuation.

The Structured Learning Course overcomes these pitfalls.

Features

This program incorporates some unique features which the author has not yet seen in any other "tutor" or computer program.

The student only learns 4 letters **or** 5 numbers at any one time.

The letters which the student learns are grouped together in such a way that he will learn "opposites", e.g. A ·– N –· D –·· U ··– This also helps in overcoming problem letters later on in the course.

The "learning" programs give the student 2 modes of operation:

Mode 1 sends a letter (or other symbol) at a single character speed of 12w.p.m. and then immediately displays the character in the centre of the screen. After a suitable pause (simulated 2w.p.m.) **the same character** is sent again and displayed for a similar period. This "Send and Display" routine is repeated three times. After the third time the letter is changed to any one of the other three letters in its groupset. A special routine prevents a letter being sent if it has just been sent three times.

Mode 1 operates for about 15 minutes and the student is advised to listen to the character and then look at the screen for the first two times that the letter is sent. On the third time he should listen and then **write it down.** This process of learning can be summed up in three stages

Listen and look
Listen and look
Listen and **write**

This sequence is repeated over and over again with the chosen four letters.

The student is also advised that the aim is to be able to **not** look at the screen but to listen, write and then look. Once he can write the four letters down without looking at the screen he should change to Mode 2 with the same letters or numbers. After only two or three sessions of Mode 1 the student should be able to use Mode 2.

Mode 2 sends 25 groups of five letters (or other symbols) at 3w.p.m. The groups will be made up from the four letters of the groupset that was learnt in Mode 1. The letters are not displayed until after all 25 groups have been sent to stop the temptation to look at the screen and break concentration. The 3w.p.m. is synthesised, i.e. the character is sent at 12w.p.m. and the inter-character spacing is set to simulate 3w.p.m.

Once the student is conversant with a groupset he is advised to practise it between learning new groupsets. Once all the groupsets have been learnt and practised the student should change to *Program 8 (Speed Practice).*

Speed Practice

This program gives the student a choice of letters or numbers, a choice of quantity of 5 letter groups made up from letters or numbers but not both, and a choice of speed from 3w.p.m. up to well in excess of 100w.p.m. At the end of sending the appropriate quantity of groups the groups are displayed, five per line, as a check back.

In all modes the check back is held on the screen for as long as the student needs it. Pressing any key (except BREAK) allows the program to proceed to the next stage. This allows the student to repeat the last mode used or to return to "Program Control".

Punctuation

The main additional symbols or punctuation characters used in the Amateur Service are also included in the program. They are, of course, not essential in learning Morse for the Amateur Test but have been included to give the student experience with them so that they are not a surprise when he hears them on the air.

Synthetic Speed

Below 12w.p.m. the characters are sent at 12w.p.m. with the inter-character spaces lengthened to give a synthetic lower speed. This has an intrinsic benefit to the stu-

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ZX81+16K

dent who now has to learn the rhythm or syncopation of the sound of a character as opposed to trying to count the dots and dashes making up that character. This is the usual cause of the well-known 8w.p.m. hang-up.

Above about 8w.p.m. the character takes on a different sound and it is this sound that we must learn. Another sound change takes place at 45–50w.p.m., but never mind that!

The character speed of 12w.p.m. was chosen as this is the speed of the official Morse Test, and this speed gives the student the actual sound throughout the course.

Speed of Learning

If you listen to Morse at a speed at which you can copy 100 per cent then the only thing that will benefit is your ego! Learning Morse requires Effort with a Big E. It demands your time, concentration and determination to make it and get that G4 licence.

To increase speed proficiency you should copy c.w. at 2w.p.m. faster than the highest speed at which you can copy 100 per cent.

It is also very important to write down every letter—if you miss one, put a dot in its place in the middle of the line. This allows you to check back more easily and you can identify the letters that you are weak on.

Copying at 2w.p.m. faster will cause you to think that you are not making any progress because of all those dots on the paper. **Don't believe it!** You will be improving all the time. Try just 10 or 15 minutes at 3w.p.m. faster and then go back to 2w.p.m. faster and see just how many fewer dots there are.

But don't over-do it. 30 to 60 minutes per session is more than ample, and probably 15 to 30 minutes is better to start with. Take at least 30 minutes' break between sessions, and as a final shot at the end of a session give your ego a boost and slow the Morse down to be able to copy 100 per cent for two to three minutes. Then forget all about Morse until the next day! Just half-an-hour every day will get you there soon enough.

Supplementary Practice

Once you have achieved 8 to 10w.p.m. start to try to copy live c.w. off air. It won't be easy, but you will start to recognise some letters and the odd word here and there, but it all helps. Watch out for the anticipation factor, though!

Mixed Letters and Numbers

A sales gimmick used by manufacturers of tutors is to give a mixed letters and numbers feature. In reality, you, as a Radio Amateur, will never be called upon to copy mixed letters and numbers (callsigns and QTH Locators apart). Even as a professional military wireless operator I was **never** required to copy mixed letters and numbers. So why bother to worry yourself with a mode of learning that you will never need? Use the time more usefully in becoming more proficient with letters or numbers.

The argument could be extended to 5 figure or letter groups, but here there is an advantage to the student. Using 5 letter groups removes the anticipation factor from the learning process. Anticipation is a bad habit to get into. It is essential to write down what is being sent—not what you think he might be sending.

For example, anticipating the ending of a word before it is sent stops the brain from working hard for a brief instant. The only way to become proficient at Morse is to

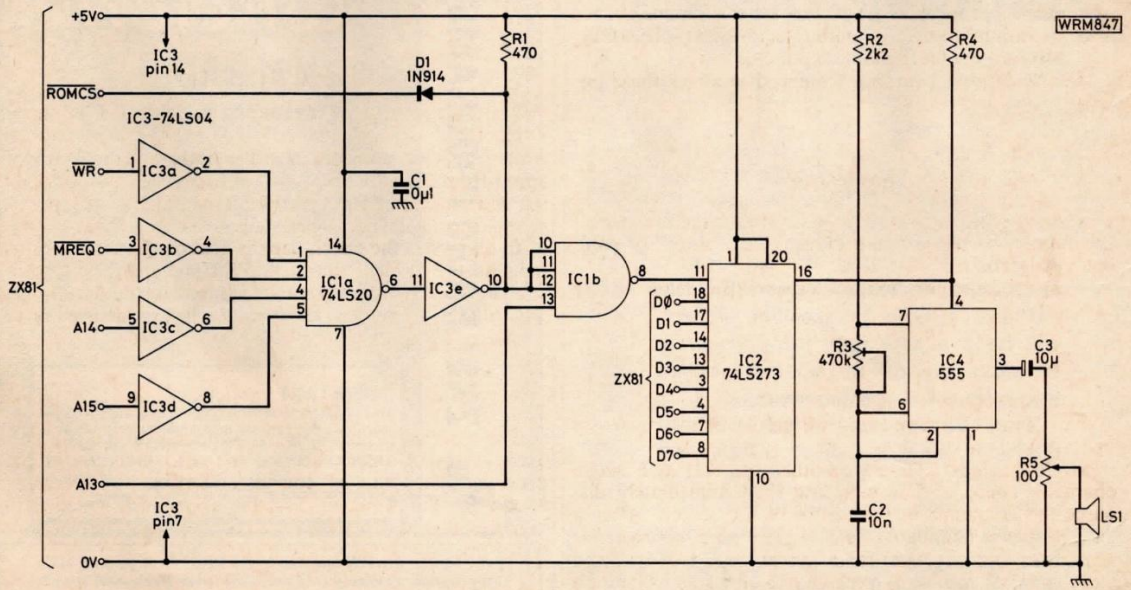

Fig. 1: This simple input port and Morse practice oscillator can be used with the ZX81. The port and oscillator can be tested by POKE 8192,2. The circuit is simply built using Veroboard, no details of the layout are given as most of the "components" on the board will be wire links between the i.c.s. The oscillator can be used with a key for sending practice by connecting the back-contacts between IC4 pin 4 and 0V and disconnecting the link between IC2 pin 16 and IC4 pin 4

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ZX81+16K

push the brain hard and reduce the reaction time between hearing the character and converting that sound into a written character on paper. Using 5 letter groups removes the anticipation factor and keeps the brain hard at it all the time, keeping the learning curve going upwards.

The Output Port

As it stands, the ZX81 will not drive an oscillator or sidetone of a transmitter without some form of interface. The MIC socket output of the computer could have been used but this was rejected on the grounds of poor audio quality and low output level. The use of a more conventional output port has other advantages if you want to use the ZX81 as a Morse sender for meteor scatter etc.

A simple and cheap output port is shown in Fig. 1, and this can be built on a piece of Veroboard. It could be hardwired into the RAM pack edge connector or a mother board could be used to allow it to be plugged into the ZX81 edge connector. The oscillator uses a 555 timer chip driving a small telephone earpiece as a speaker.

Any other output port for the ZX81 may be used so long as its output goes high (1) for address 8192,2.

A cassette with this program on it is available from Practical Wireless Cassette Tape Offer, Dept PWC1, Rochester X, Kent ME99 1AA, price £5.75 inc. postage and VAT. See this page for details.

Timing Errors

To all intents and purposes the correct ratio of pauses for a character speed of 12w.p.m. have been set up in the program. However, not all ZX81s are identical in their internal timing and in some instances the internal clock accuracy may not be tight enough to ensure that the 12w.p.m. practice speed is in fact 12w.p.m.

To ensure that this is so, some form of calibration is needed and the following procedure should be used after loading the program into the computer for the first time.

1) LOAD and RUN the program from the cassette
2) Select *Program 8*
3) On demand enter "1" letters
4) On demand enter "12" groups
5) On demand enter "12" w.p.m.
6) On demand press any key (except BREAK)
7) On the advice "Groups loaded and ready to send" press any key **and at the same time** start a stopwatch going.
8) Time the sending of the 12 groups. This should be 1min 1s (61s). (The extra 1 second is the pause between pressing the key and the ZX81 starting to send the first character.)

If the average time of, say, four timing tests is over 61s the program is slow, if it is under 61s then the program is fast. Correction can be applied as follows:

1610 POKE 16605,1600/ 12

The boxed part 1600 needs changing by 10 up or down until the correct average time is achieved. Changing down increases the speed, up decreases it. If the timing tests give an average time of ±3s of the correct time do not bother to change the timing. ●

ZX81 RADIO PROGRAMS -2

Practical Wireless

ZX81 RADIO PROGRAMS -2

PW STRUCTURED MORSE LEARNING COURSE

Use either side of tape
Load as "M" (16K)

An output port and Morse practice oscillator are required for use with this program. A suitable circuit appeared in PW August 1983. Any output port designed for use with the ZX81 can be used providing the output goes HIGH for address 8192,2 and LOW for 8192,0

IMPORTANT
Many cassette recorders impress a brief and inaudible spurious pulse onto the tape when the play button is pressed. ON NO ACCOUNT STOP OR START THE TAPE OTHER THAN AT THE BEGINNING OR END. Disregarding this warning could result in permanent damage to the recorded program.

Learn Morse the PW way using the ZX81+16K as your tutor. This program teaches you Morse code to the level needed to pass the Post Office Morse Test. As well as the cassette and ZX81+16K you will need a simple output port and practice oscillator as described in PW August 1983.
The cassette will be available from PW stands at selected Rallies and Exhibitions, price £5.00, or by post from — **Practical Wireless Cassette Tape Offer, Department PWC1, Rochester X, Kent ME99 1AA** price £5.75 inc. post, packing and VAT.