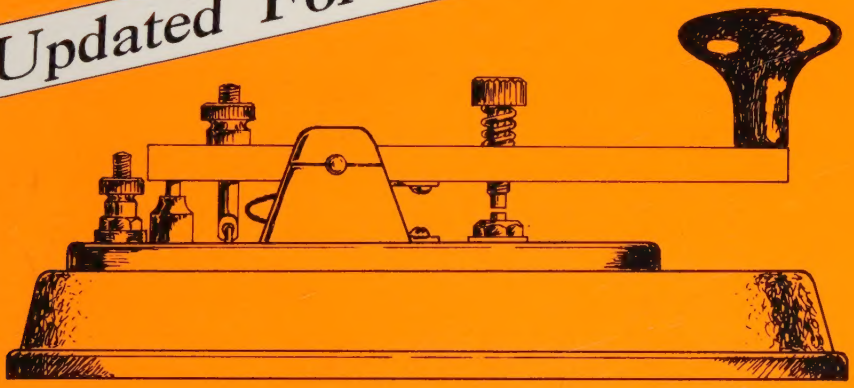
THE SECRET OF LEARNING MORSE CODE

BY

MARK FRANCIS

Updated For Novice Licence



A UNIQUE GUIDE TO LEARNING MORSE CODE
– – · – QUICKLY AND PROFICIENTLY · – – ·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Mark Francis

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AUTHOR'S NOTE

Since writing this book I have noticed the many letters that have recently been appearing in various radio magazines concerning the Morse test. They all seem to carry the same message; the mode is outdated, therefore why should Radio Amateurs be required to learn this "outdated" code before being allowed on to the short wave bands? I am convinced that in most cases this is just a thinly disguised excuse to cover the basic problem of laziness. Many prospective class A licensees feel that they just cannot be bothered to learn the Morse code.

To me, it seems sensible to have the ability to use all modes which are available to us for reasons which are explained in the latter part of this book. In these days of expensive hf stations, let us not lose sight of the fact that constructing a cw transceiver is both inexpensive and relatively easy. It does not even need to be very powerful. The satisfaction to be gained from low power DX contacts is enormous, especially on equipment you have built yourself. So come on all you fainthearted people, I know that there are many modern devices available to send all kinds of data, but let us not forget that Morse code is real amateur radio. A skill that you can be proud of and one that puts your ability into a different class from the "black box press and talk" merchant. We can train monkeys to press buttons that operate complex pieces of equipment, but the animal has no understanding of the end product. I use a calculator almost every day of my life but it does not stop me performing calculations in my head every now and again to keep my brain working.

It is true what they say, "no pain, no gain." If you just want to talk into a microphone, you might equally be at home as a taxi controller. Indeed, listening to some of the monologues that take place on the hf bands one wonders whether the operator would not be equally as happy with just a microphone to clutch! If you want to become a class A licence holder, there seems no just reason why the Morse test should not continue to be a requirement of the licence. If you wish to forget the Morse code once you have passed the test, then you have that option. But I can assure you that Morse is much harder to forget than it is to learn. Amongst the amateurs that I know, there are far more who want to see the Morse test retained than there are those that want to see its abolition.

Up until now the main commercial users of Morse code have been maritime orientated. However, it has recently been reported that the international maritime organisation have as a result of their new global maritime and safety system, in effect brought about the phasing out of the use of Morse code at sea. It will be replaced by satellite and data transmission equipment by the end of the century.

Nevertheless there will, for a long time yet, be ships from developing countries where the cost of the equipment cannot be afforded or justified because of the nature of the vessels usage. Consequently, coastal stations will have to maintain their use of Morse code when communicating with such ships. Indeed it is highly likely that Morse code will still be used for some years to come, even if only as a backup system.

International use of Morse code for commercial applications may be diminishing, but it is by no means dead. Current information suggests that the US Navy, Air Force, and Marine Corps as well as the Soviet Navy, still rely heavily on Morse code. If its good enough for the "super powers" then it is good enough for me!

As Geoff Arnold once said in Practical Wireless magazine, "Learning and using Morse is a challenge; it exercises the mind and promotes bodily coordination, but most of all it is fun."

Mark Francis *Hornchurch, April, 1989*

Foreword

My reasons for writing this book are many and varied. Two years ago I could not read a single letter in Morse code. My main objective in wanting to learn, was my desire to obtain my class A amateur radio licence. This meant I had to knuckle under and learn the code, a task that I had secretly dreaded for some time. This book is a direct result of that experience.

This book is based on trust between the reader and the writer. You must believe what is written and that it will actually work for you. Be patient in the early stages, you will not learn Morse overnight, but you will be successful if you follow my recommendations and practise them regularly. Try to find somebody else to learn with if you can. Enthusiasm is a vital ingredient in learning; you must possess this to do well. Your reasons for learning the code may well be solely to obtain your class A Amateur Radio Licence. But whatever your reason, keep this goal to the forefront of your mind as an incentive to help you over the difficult periods.

I have heard of one "G3" who loves Morse so much he has put on his QSL card the legend:- "The charms of Bach are a cacophony compared to the sweet melodies of Morse." I am not sure I fully agree, but it does go to show how deeply people can feel about Morse.

I have received so much help and advice from fellow amateurs that I felt this should be recorded and passed on to others, so they may also benefit from all the suggestions and advice given to me. Hopefully my experiences can help others avoid the pitfalls I encountered. There are many conflicting ideas and views on the best approach to Morse

code. Perhaps this is to be expected. I can only make suggestions on the methods that worked for me. You must follow the route you feel most comfortable with. The purpose of the advice and information contained within these pages is simply to act as a guide. I have tried to avoid anything that may be controversial and kept to those methods that not only helped me, but I know also to have helped many others.

During the period in which I was learning the code I talked to many people about various aspects of the subject. Some of the questions I asked were, in retrospect, naive. But in all cases, my questions were dealt with sympathetically which is a tribute to the hobby of amateur radio itself. Nevertheless, I would like to thank all those poor individuals upon whom I thrust my many questions. Unfortunately they are too numerous to acknowledge, but I am sure they will smile a little when they read this book and recall my early days of learning.

One of my earliest questions concerned the need to learn the code at all. After all, wasn't it an outdated mode of communication with little use in todays modern World? I know that many fellow students hold similar views and it is not difficult to understand why. Here we are with micro computers capable of transmitting vast quantities of data by a variety of sophisticated means in a matter of seconds. We have telephones that can link us to anywhere in the World at the press of a button. Why should we need something so obviously antiquated as a Morse key? These and many similar questions inevitably arise in the mind of the reluctant student.

Morse code is the oldest means of radio communication and yet is also one of the most reliable. It is not until you come to study the code that you begin to realise just how effective it can be. When voice communication fails owing to weak signals or interference, Morse code signals will invariably get through. Yet the equipment requirements are the most basic of all. There are many circumstances, both at professional and amateur levels where these advantages are of paramount importance. I personally know of several amateur radio operators who are 100% code operators. Not only do they find it ideal for long distance contacts with modest power and aerial systems, they also enjoy the satisfaction and pleasure obtained from practising their skills as CW operators.

Hambo! Radio fan saves 2

By SHARON ROWE

TWO German yachtsmen adrift in the Atlantic were safe ashore last night—thanks to an alert British radio ham.

Butcher Brian Tutt picked up a mayday call from the sailors on a sinking yacht off Ascension Island in the South Atlantic.

The island's RAF station was alerted, but a helicopter search failed to find the men on Wednesday.

Diligence

Another distress call was picked up on Saturday night.

Then the two men were found in a dinghy near their part-submerged yacht Faiia, and rescued by a ship on Sunday.

Mr Tutt, of Herne Bay, Kent, said yesterday: "When they didn't find anyone I thought I'd wasted the coastguard's time."

A coastguard spokesman said: "Mr Tutt's diligence paid off."

Rescue alert from distance of 4,500 miles

By Anthony Hopkins

A RADIO HAM from Herne Bay, Kent, described yesterday how he played a key part in the rescue of two German yachtsmen 4,500 miles away in the South Atlantic.

Mr Brian Tutt, a 36-year-old butcher, was tuning in to a South African caller when he caught the first faint message from the yachtsmen, who were huddled in a dinghy close to their stricken vessel, Faiia, eight miles north east off Ascension Island.

He alerted the local coastguard, who launched an international rescue operation.

A British merchant navy ship located the partly sunken yacht and took the two men aboard.

'Complete chance'

Mr Tutt, who regularly calls friends in Australia and North Carolina, USA, had been listening to a conversation between a South African and an American when the Mayday message came through.

"It was a complete chance that I was there listening at the time," he said. "I am so pleased I was able to help—but more pleased for the men involved than for myself. Everybody always responds to a Mayday message."

Afterwards, Mr Tutt said he had forgotten about the call until he was told that the yachtsmen had been rescued.

He said yesterday that his radio aerial, which can be extended up to 45ft and which cost about £1,000, had led to complaints from neighbours that it interfered with their television reception.

800-mile alert by radio saves 16 lives

By GEOFFREY LAKEMAN

RADIO operator John Chappell was the only man on earth to hear a sinking ship's desperate Mayday call yesterday — and he helped to save 16 lives.

The faint morse signal came through John's headphones halfway through his shift at British Telecom's station at Land's End.

John, 40, worked out the stricken ship's position and was amazed to find it was a few miles off Gibraltar — 800 miles away from him.

He said later: "We are only supposed to be able to pick up signals from about 300 miles, but sometimes there are freak conditions.

"I contacted the nearest radio stations in Spain and North Africa, but they knew nothing about it.

"Then I realised that I was the only person who had picked up the message."

Less than 45 minutes after John raised the alarm, the crew of the 6,000-ton Cypriot cargo ship, Miki-K, were safe.

A German warship picked up all 16 men from liferafts.

The above extracts are printed by kind permission of, (from left to right) The Sun, The Daily Telegraph and The Dail Mirror newspapers.

In this book you will see constant reference to "CW." This is an abbreviation for "Continuous Wave" and refers to the output signal from a transmitter that carries no speech or other information other than a steady "carrier" which is periodically interrupted by means of a Morse key. Morse code is a truly classless method of communication, all races and religions sounding the same. There are no regional dialects to confuse or prejudice the listener. It is also an international language. Most foreign stations know enough English words in Morse code to hold "rubber stamp" contacts. There are no pronunciation problems when using the Morse key. This helps break international barriers, something I think most of us welcome. Without the ability to use Morse code you are missing a vital ingredient that helps to make you a truly "professional" operator.

But Morse code is not only about personal satisfaction and enjoyment. Tragic as the circumstances may well be, there is immense satisfaction to be had in knowing that you have the ability to copy an SOS signal should the need arise. The first SOS to be transmitted was from the Titanic, and there have been a number of well documented cases where radio amateurs have picked up Morse code SOS signals resulting in lives being saved. Only recently, there have been two quite amazing cases reported of lives being saved by amateur radio enthusiasts who had acquired the skill of reading Morse code. The illustration on the previous page shows the newspaper extracts.

Perhaps there is a little piece of Tony Hancock in all of us just waiting for an opportunity to show off our skills. Morse code is still used extensively at sea although modern technology has made big inroads into this area of radio communications. However, there will no doubt be future occasions when SOS signals will be intercepted by radio amateurs.

The intention of this book is to try and help you learn Morse in the quickest possible way. An in depth treatment of this subject is long overdue. It is hoped, therefore, that this publication will have filled the gap.

Mark Francis. *Hornchurch, August, 1987.*

CHAPTER 1

How It All Started

What better place to begin than by learning a little about the history of the Morse code? The name belongs to Samuel Finley Breese Morse (1791-1872). It was he who devised the idea although at one stage Messrs Gale, Vail and Smith were working together with Morse to develop the code. Instead of learning the Morse code we might have been learning the Gail, Vale or Smith code!

Morse first had the idea for a code whilst travelling on the Steamship Sully, which sailed from France for New York on October 1st 1832. Morse was in fact an artist and having studied art for the past three years in Europe, was now on his way home to the USA. He had made up his mind to paint a picture of historical value. Little did he realise that he was shortly to invent something that would make him far more famous than any of his paintings were ever likely to.

Whilst on board the Steamship Sully, Morse overheard a conversation in which a certain Mr C.T. Jackson mentioned an electro magnet which he had with him. This was a very new piece of apparatus at the time and Morse became curious to see it. He had become interested in electricity having learnt much about the subject during his travels in Europe. The subject fascinated him, and he was anxious to learn about the latest developments.

It had long been established that electrical current had the ability to travel faster than any other medium. Morse began to reason that if intelligible signals could in some way be superimposed on the current, then messages could be sent over great distances with virtually no time delay. At this stage in the development of electrical devices, the only obvious way of signalling, was by the simple expedient of switching the supply on and off. Morse reasoned that if

this could be translated into some form of code, then it would be possible to convey messages via electrical cable. The slow, leisurely journey across the Atlantic gave Morse much time to consider the possibility and by the time he reached New York, he had the broad outline of a system in his mind. The idea was simple but the code had to be worked out. Logically the vowel sounds needed to have the shortest codes because of their frequent use.

A portrait of Samuel Morse reproduced by permission of The Trustees of The Science Museum., London.

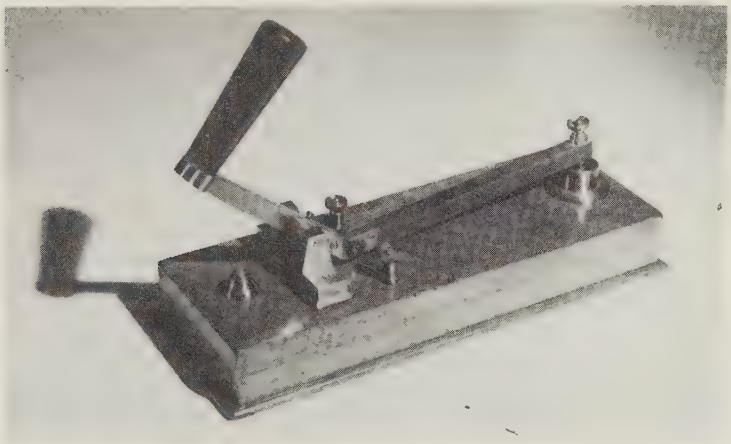
It was not until three years later, that he built his first telegraph set. It proved his theory by working well and he eventually patented it in 1840. However, convincing the authorities was another matter. It proved to be a long struggle, but finally, in 1843, he was given funds to set up a 35Km telegraph line from Washington to Baltimore. It was on the 24th May 1844 that Morse code became officially inaugurated and those famous first words in Morse were sent: "What hath God wrought". This initial demonstration of Morse code was well received and rapidly led to its widespread use. It is not difficult to imagine the inevitable success of a system that could send messages instantly over distances that had previously taken hours or even days by horse or train. Morse in fact lived to see well over 100,000 miles of telegraph lines installed in America alone.

The code, and methods of sending it, have come a long way since Morse carried out his first simple experiments. In the early years many variations of code were introduced but an International code was finally agreed upon in 1851. This has remained unchanged ever since.

Prior to the advent of radio, a number of ingenious pieces of machinery were developed to automate communication by Morse code. These included a clockwork machine which read the code as dots and spaces on a reel of paper. Another machine for sending the code was devised. This was fed with type-face that had milled codes on its surface. These coded letters opened and closed the circuit as they passed through the machine. It was not until 1840 that the Morse key was introduced, although Vail subsequently claimed that this was his invention.

Meanwhile, experiments were being carried out to find the best method of conveying these signals to their destination. Initially, the cables to carry these signals were placed underground. Unfortunately this proved unsuccessful, mainly because of defects in the insulation. Instead, cables were erected above ground and stretched between the now familiar telegraph poles that are such a typical sight in many of the old western films. The pictures of the telegraphist sitting in a log cabin next to a railway line in the open prairie are very close to the truth.

New Morse code recording machines were soon developed. Some made little holes in paper tape which poured out of a recorder; others used an inked wheel. But copying Morse code by ear was achieved really by accident. Whilst watching the mechanical decoders, operators soon learnt the key click sounds and could distinguish the individual letters. This worked well at moderate speeds, but at faster speeds the operator had to rely on the mechanical decoding machine once again. It is important to remember that in those early days the operator could only hear clicks, there were no continuous tones. By 1890 speeds of 70 words per minute were being achieved using automatic senders and receivers.



An early "Grasshopper Key" manufactured by Marconi. Reproduced by kind permission of The Trustees of The Science Museum, London.

By the early 1900's, Morse code was being used regularly for marine communications and it was during this period that the Police in this country made their first arrest as a result of information provided by Morse code. A certain Doctor Hawley Harvey Crippen, (1862-1910), had killed his wife in favour of his mistress, Ethel le Neve. In an attempt to evade the police, Dr. Crippen and his mistress, (the latter disguised as a boy), boarded the SS Montrose sailing from Antwerp to Canada. The captain of the vessel, Captain Kendall, became suspicious of these two passengers and guessed

their real identity. He at once sent a wireless telegraphy message to New Scotland yard, and as a result, Dr Crippen was arrested and successfully brought to trial. The original telegram is still to be seen in the famous "Black Museum" together with other, somewhat more bizarre exhibits.

It seems very unlikely that Morse code will ever become obsolete. Its very simplicity is its virtue; a strange contrast to many of todays advanced forms of communications. Samuel Morse died on 2nd April 1872 and is remembered each year by American special event station K2KN. This operates from Morse's original house in Locust Grove, Poughkeepsie, U.S.A. If you pass your Morse test and obtain your class A licence, you might be lucky enough to work the station. A QSL card for the contact would certainly make a nice decoration on the shack wall.

CHAPTER 2

Making Your Mind Up

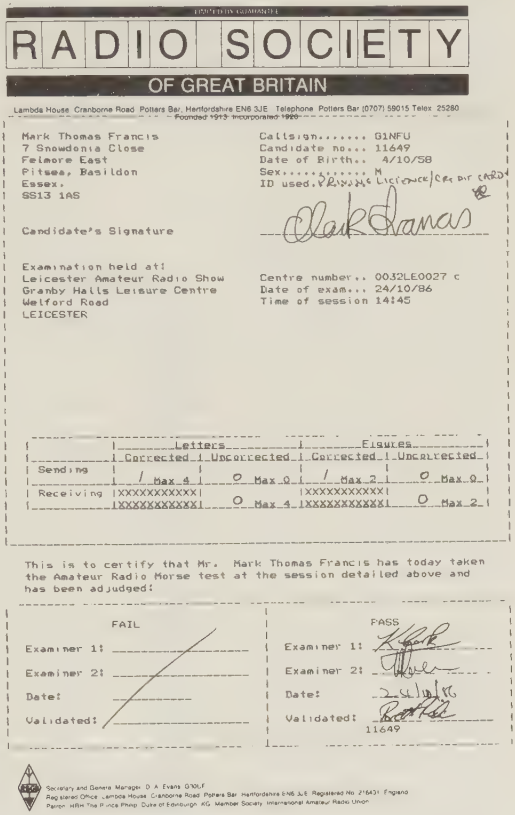
Your reason for wanting to learn Morse code will probably be to obtain your class A amateur radio licence. This will enable you to operate on the short-wave radio bands. Ironically, one of the hardest parts of the whole process of learning Morse code, is the initial decision to actually do something about it. This does not mean saying to yourself, "I will start if it rains on Sunday," or, "I will wait until my friend passes the R.A.E. and then we can learn together." You must make the decision to DO IT NOW! You have purchased this book, so you already have taken the first step towards your pass slip. Make the decision to start and above all, to continue until you have succeeded. Remember, no excuses, you can fool other people but you cannot fool yourself!

It is necessary to totally immerse yourself in the subject. If you don't, there is little point in proceeding any further. Learning Morse code is all about developing an automatic response to coded signal pulses. Your brain has to be trained to translate rhythms into letters and numbers. The word "rhythm" is deliberately used rather than "dots and dashes". Later you will realise the importance of this differentiation. The only way to develop this skill is to practise regularly, again and again until eventually the translation process becomes truly automatic. Remember, you will be listening to rhythms, not individual dots and dashes.

Often these rhythms become associated with every day sounds. For example, you may be walking in the street and happen to hear a car's hooter: "beep, beep". After a few practise sessions you will find your brain translating this into the letter "M". It may sound silly now, but, while you are preparing for the examination you must live, eat, sleep and breath the Morse code. Do not forget that it is

quite within most people's ability to achieve the required standard within 2 to 3 months. That is all the time it takes if you are prepared to work at it a little each day. In the armed forces they are expected to be proficient after only a few weeks, but, as we want to remain sane, we shall allow ourselves three months!

During the next few months of learning the Morse code, the name of Samuel Morse will be foremost in your mind. What you are going to learn in a short space of time actually took this great man many years to perfect and refine. The first words ever sent in Morse code take on a new meaning: "What hath God wrought?".



RADIO SOCIETY
OF GREAT BRITAIN

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Sex..... M
ID used. DRIVING LICENCE/CREDIT CARD

Candidate's Signature

Examination held at:
Leicester Amateur Radio Show
Granby Halls Leisure Centre
Welford Road
LEICESTER

Centre number.. 0032LE0027 c
Date of exam... 24/10/86
Time of session 14:45

	Letters			Figures			
	Corrected	/	Uncorrected	Corrected	/	Uncorrected	
Sending		/ Max 4	0 Max 0		/ Max 2	0 Max 0	
Receiving	XXXXXXXXXX			XXXXXXXXXX			
	XXXXXXXXXX		0 Max 4	XXXXXXXXXX		0 Max 2	

This is to certify that Mr. Mark Thomas Francis has today taken the Amateur Radio Morse test at the session detailed above and has been adjudged:

FAIL	PASS
Examiner 1:	Examiner 1:
Examiner 2:	Examiner 2:
Date:	Date: 24/10/86
Validated:	Validated: 11649

Secretary and General Manager: D. A. Evans G1OLF
Registered Office: Lambda House Cranborne Road Potters Bar Hertfordshire EN6 3JE Registered No. 216401 England
Patron: HRH The Prince Philip Duke of Edinburgh KG Member Society International Amateur Radio Union

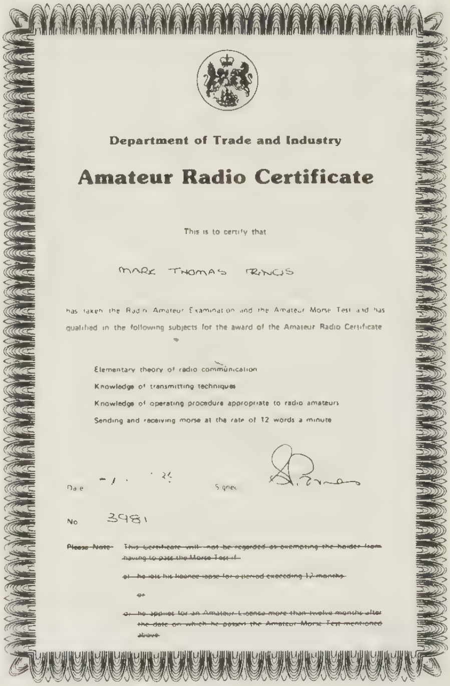
RSGB Pass Certificate. G0GBY

I hope that you will learn from this book two very important things that should remain uppermost in your mind throughout your period of learning. These are perseverance and the ability to carry on when the going gets difficult.

It has been said that about 70 hours practise is all that is needed to pass the test; say it quickly and it doesn't seem too bad! Learning is usually a three stage process. Learning the code, learning

to receive it, and finally learning to send it. Here is a note of encouragement, particularly for those of you who have not had to study for exams in recent years. Intense concentration for long periods is not the key to success. Teaching ourselves Morse is like programming a computer. Our brain takes time to load, so load it carefully. Trying to feed too much information into it before it is ready to receive it, will be to no avail. Once your mental faculties have been taught to recognise the code, you will find that your memory is automatically triggered, and translating the Morse code will become a natural process. Excessive concentration causes a breakdown of this process because automatic translation is established in the subconscious not the conscious.

At first, you may find it difficult to comprehend how the reception of Morse code can become a natural process. If you have ever had the opportunity of seeing a skilled operator in action copying the code at speed you will realise that it can be nothing other than a natural process. You may wonder how anybody can copy all those fast dots and dashes? They appear to be sent so fast that they are impossible to count. The fact is that with practise you can become just as skilled as any professional. But you must know the SECRET of learning Morse code. In the next few chapters



Department of Trade and Industry

Amateur Radio Certificate

This is to certify that

MARK THOMAS FRANCIS

has taken the Radio Amateur Examination and the Amateur Morse Test and has qualified in the following subjects for the award of the Amateur Radio Certificate

Elementary theory of radio communication

Knowledge of transmitting techniques

Knowledge of operating procedure appropriate to radio amateurs

Sending and receiving morse at the rate of 12 words a minute

Date

Signed

No 3981

~~Please Note: This certificate will not be regarded as exempting the holder from having to pass the Morse Test if:~~

~~either he lets his licence lapse for a period exceeding 12 months~~

~~or~~

~~or he applies for an Amateur Licence more than twelve months after the date on which he passed the Amateur Morse Test mentioned above~~

Class "A" Amateur Radio Certificate. G0GBY

you will learn exactly how this skill may be achieved.

A measure of the kind of skill that can be achieved was demonstrated many years ago by T. R. McElroy of the USA. On the 2nd of July, 1939, he sucessfully received Morse code at a speed of 75.2 words per minute. This speed was achieved during a tournament at Ashville, North Carolina and reports state that he copied the text directly on to a typewriter and at one time was actually typing 2 words behind the text being received! This kind of performance rather puts our goal of 12 words per minute into perspective.

It is a good idea to actually book your test with a three month time scale in mind. This will give you a target to aim for. Knowing the date for your test at the outset will provide both an incentive and a sense of urgency. Hopefully you will have little time to become disillusioned with the inevitable "stop start" progress that most of us experience. You will be continually striving for a faster and faster speed but it will not always be apparent just how much progress you are actually making. Progress is best measured on a week to week basis rather than a daily one.

A positive state of mind is essential throughout your total learning period. With the knowledge that it will all be over in a few months it should be easier to sustain the effort required. Once Morse is learnt and used for a period of time it is never forgotten. The skill of sending and receiving Morse code will be with you for ever; a considerable reward for the relative effort involved. Above all, do not forget your original reason for learning. Apart from the personal satisfaction of developing a useful skill, you will shortly be the proud owner of a class A Amateur Radio licence that will enable you to operate on the HF bands. The sooner you get down to learning the code, the sooner you will be able to enjoy the benefits.

Once you have actually made the decision to start learning the Morse code, half the battle is won. But from now on, no excuses. Put all negative thoughts out of your mind. If you follow my recommendations for learning Morse, nothing will stop you passing.

For some reason, all examiners seem to be regarded with a certain amount of awe. I have met many Morse examiners, and not one of them resembles the forbidding ogres that they are sometimes made out to be. No horns or fanged teeth; just ordinary people like

you and I. I am convinced that examiners know within the first few moments of a test whether or not a candidate has reached a satisfactory standard to pass. Likewise, a person should know, if he is honest with himself, whether or not he has attained sufficient proficiency to pass.

Examiners are there to assess your ability to receive and send Morse at a specific speed with the minimum permissible errors as prescribed in the examination syllabus. That is their sole task. If you can achieve this level of performance regularly at home or at the club, there is no reason why you should not pass. You just have to prove to the examiner that you can fulfil this minimum requirement, nothing else.

We all get nervous when taking examinations, but those who have either not reached the standard or who can only copy 12 words a minute on a good day have good reason to worry! Learn the Morse code to a level well above the minimum test requirements and any slight nervousness should be outweighed by your superior capability. Examiners know people are nervous and allow for this. They are mortals like you and I, and have been through the same test that they are now supervising. They really do everything they can to put candidates at their ease.

On the day that I took my Morse test, there were three officials present. I can honestly say that I could not have wished for nicer people. I had worked hard to learn the Morse code and build up my speed. Passing the test was just confirmation of this hard work. It would be foolish to ignore the factor that nerves play. Some of us suffer to a much greater extent than others. However, I am convinced that if you know that you have consistently achieved the necessary standard during practise, any nervousness will be at a sufficiently low level not to affect the outcome of the examination. Hopefully, if you follow the advice given in these pages, you will pass first time, nerves or no nerves.

I cannot overemphasise the need to maintain a positive attitude. This means having a good reason to want to learn and pass the Morse test. In most cases it will be the wish to obtain an HF transmitting licence. Whether or not we intend to use Morse on the bands is another matter. It has to be said, that many newcomers grow to appreciate CW, and come to use it regularly. Nevertheless,

like it or not, this is the hurdle we must overcome in order to achieve our objective. There is little point in pondering the pros and cons of the matter; learn it we must and learn it we will.

Once you have passed the test, (and I assure you, you will) you will derive a great deal of satisfaction from CW operation. Many of you will probably continue to use CW for many years to come, once you have obtained your class A licence. After all, despite the primary reason for learning Morse, it would seem a great pity to have expended such a great amount of energy in learning, only to discard the skills the moment you have passed the examination. The sense of achievement is great. The initial struggle to get started makes that achievement even more satisfying, particularly when you experience the first pleasures of operating on the HF bands and communicating with fellow amateurs across the World.

Not only is it satisfying to be able to operate on the HF bands, it is also satisfying to be able to read Morse code. I well remember having great admiration for people who could read the Morse code. I was sure it was a skill that needed years of practise and one that was beyond my capability. I can recall going to rallies and exhibitions and hearing visitors trying out Morse keys and wondering whether they were sending anything meaningful. Now I know! I can also recall tuning around on the shortwave bands and wondering whether the Morse signals I could hear were amateur or commercial signals, and what they were sending. At times it was frustrating, I even considered purchasing a Morse reader. Fortunately I came to my senses. Why should I purchase a machine to do a job that my brain was capable of doing far more efficiently?

If you begin now, you could be sending your first CQ on the HF bands in 3 months time. Don't delay, start right now!

To book a Morse test for the Radio Amateur Class A Licence, write to the RSGB *(see Appendix-G)* for the appropriate application form. When you receive the form you will also receive a list of test centres and dates available.

CHAPTER 3

Learning The Basics.

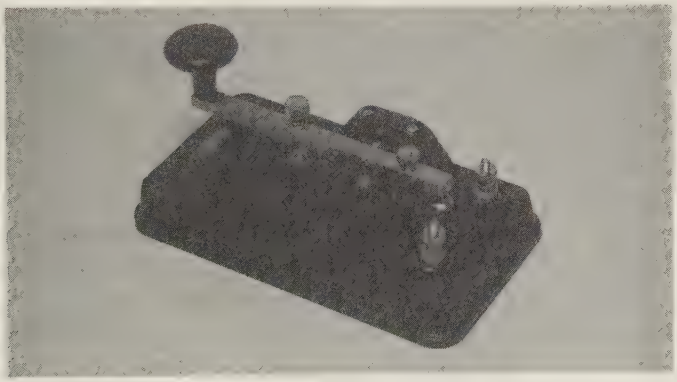
Our first task must be to learn the individual letters and numbers. It is essential that we tackle this task in the correct manner as it will have a profound affect on your ability to progress beyond the early stages. Once the initial task of basic learning has been achieved the next objective must be to increase the speed at which the code can be read. In other words, we have to reduce the amount of thinking time that it takes for our brain to decipher each letter or digit. We don't need to worry about punctuation marks. Although these are catered for in the Morse code, they are not a requirement of the examination. We will be busy enough coping with 26 letters and 10 digits! However, if you carry on using Morse after successfully passing the examination, you will need to know a few punctuation marks. These can be quickly learnt and should cause no bother.

Now we come to one of the most important points in learning the Morse code. Its importance cannot be overemphasized. Failure to follow this advice will not only hamper your progress, but will eventually impose a limit on the maximum receiving speed you are able to achieve. Forget "dots and dashes." They are one of the biggest bogies in the learning process. If you try to learn Morse code by listening for individual dots and dashes you will find yourself trying to count them mentally. Follow this course of learning and you will never become proficient at CW. Worse still, you will find that once you have tried to learn in this manner, it is very difficult to change to the preferred rhythm method. Never mention or think of dots and dashes again.

Morse code is a rhythm process. You cannot successfully copy Morse code in any other way. You must listen to the rhythm and learn to recognise the different shapes in much the same way as

a musician instantly recognises different musical styles by the rhythm. Each character has its own unique sound; sounds you must learn to recognise. Later, when hopefully you carry on to use the code on the air, you will find that you are not only able to recognise individual characters, but also whole words. But that is all to the future. Let us concentrate on the problem at hand.

Each character should be recognised by our brain as a little tune. We need to be able to write these tunes down in a form of notation that can be easily understood. This is done by assigning the words "dah" for long pulses and "dit" or "di" for short pulses. Lets take the first letter of the alphabet. "A" would be written down as "di dah". In this way it can be read and remembered as a little tune. If we had to use the old "dots" and dashes" notation, (Sorry!) we would then have to translate this into sounds and then into characters. By doing away with this stage of the process we have reduced the thinking time, a major step in the right direction.



A Simple Morse key used by many operators today.

Another major mistake is to attempt to write down the individual letters and plain text in capital letters. This is fine at slow speeds but can be a positive handicap at faster speeds. For some reason, most of us seem to think that because we are learning a new language we must revert back to our early school days of block capitals. Unless you normally write in this manner, such a habit should be avoided. Instead, write down the text in normal handwriting. You

will find it much more comfortable. If you cultivate this method of writing down the coded messages, you will aid your ability to receive at faster speeds. It is quite surprising how many people actually make things more difficult for themselves by writing in block capitals. Keep to normal handwriting and you will make things easier for yourself.

Having covered the two major "don'ts", we come to a problem that involves our old friend, "negative thinking". Many students look at the Morse code and think they will never be able to remember all the different characters. You are required to actually learn 36 different characters. That may sound quite a lot, but when you consider how many different words in the English language you have stored in your brain, this number becomes almost insignificant. In fact, you will be quite surprised how easy some letters are to learn. We've already mentioned the letter "A", and you may well have managed to remember it. (di-dah).

Even if you have never studied the Morse code before, many of you will know the letters "S.O.S." in code. Featured so many times in war films, the familiar sound of "di-di-dit dah-dah-dah di-di-dit" is something than many of you will know. That's already three letters you know:- A, O & S. Not much use to us, but it does demonstrate how easy the code is.

Another interesting point to emerge from this is one that underlines the recommended method of learning. Anybody who recognises SOS will almost certainly have done so by recognising the rhythm from the TV films. They will not have been counting dots and dashes. This will help to demonstrate how easy this method of learning really is.

The Alphabet.

Now we are going to start the process of actually learning the code. Trying to learn all the letters in one go is a pointless task, and one which most of us would find impossible in any event. Instead, we will take a look at the easy characters first of all. The 7 letters we will first look at are:- E T I M S O H.

e = dit	**t** = dah	**i** = di-dit	**m** = dah-dah
s = di-di-dit	**o** = dah-dah-dah	**h** = di-di-di-dit	

Now remember, we are learning rhythms and should learn the letters with this in mind. Some students find that associating a letter with a well known tune or rhythm, helps them. For example, let us take the letter "H". How many times have you sat on a train and heard the familiar di-di-di-dit as the train passes over the track jointing plates? Remember this sound and you will remember the letter "H" easily. Try it; it really does work.

Of course, you don't have to associate a particular everyday sound with each character. That would prove impossible. But the "H" is a good example of how it can help. If you attempted to count the individual pulses, you would find it totally impossible at all but the very slowest of speeds. Remember, each letter has a rhythm pattern and you will learn to recognise it instantly.

Try to commit these first seven letters to memory. Close your eyes and imagine the musical sound each of these letters makes when transmitted. Pick any letter from the group at random and try to recall the sound it makes. The letter "E" and "T" are particularly easy to remember as they comprise a single short and long pulse respectively.

So now you have learnt 7 letters. There are only 26 letters in the alphabet so we are already a quarter of the way through. Take a break and come back to the book later. If you try to press on without a break you will find yourself starting to forget the first group of letters you have learnt.

Short bursts of effort are far better than lengthy sessions followed by several days without any study. The actual study periods can be quite short, say 10 or 15 minutes; 2 or 3 of these a day will assure that you make rapid progress. The rest periods in between are equally important. The brain seems to carry on working on these let-

ters committed to memory, in our subconscious mind. When you return to your studies a few hours later, you will find that you invariably do better than when your previous study period ended.

Remember at this stage we are simply trying to learn the alphabet in Morse code. We are not attempting to read any signals. Above all, resist the temptation to send Morse code. It will do you no good and may well introduce bad habits that are later difficult to break.

There are several ways to learn all 26 letters in the alphabet. We could, for example, go from A to Z in alphabetical order and commit them to memory in this way. Unfortunately this may have the effect of introducing a kind of routine to our memory process. This is something we want to avoid. Your ability to copy letters must be automatic and instantaneous so that you are able to copy letters completely at random. Anything that attempts to inhibit your random reading ability should be avoided.

There are several ways in which you can complete your learning of the alphabet. The method I employed is simple and probably as good as any other that has been recommended. Take four pieces of paper about the size of a credit card. On the first piece write down the seven letters we learnt above. On the next piece write:-

a = di-dah	**w** = di-dah-dah	**u** = di-di-dah
j = di-dah-dah-dah	**v** = di-di-di-dah	**f** = di-di-dah-dit

on the third piece write:-

c = dah-di-dah-dit	**g** = dah-dah-dit	**k** = dah-di-dah
q = dah-dah-di-dah	**p** = di-dah-dah-dit	**z** = dah-dah-di-dit

and on the fourth piece write:-

r = di-dah-dit **y** = dah-di-dah-dah **l** = di-dah-di-dit

b = dah-di-di-dit **x** = dah-di-di-dah **d** = dah-di-dit **n** = dah-dit

Now take each piece in turn and spend as much time as necessary, until you know all the characters. Again, don't try and learn them in one session. I have heard of people taking only half an hour to learn the alphabet. Perhaps this book is not for them! It took me quite a few days. Do not spend so much time that you become weary. The learning process can be enjoyable provided that you tackle it at a leisurely pace. As the time for your examination approaches, you will need to increase the length of your practise periods. But for now we can take a more sedate approach.

Within a few days you should know most of the letters. At the end of your first week you should be able to remember the rhythm associated with each letter of the alphabet. Do not forget that the letters are little tunes. Let's take a look at another couple of examples.

Look at the letter "Q". The written sound is "dah-dah-di-dah". This rhythm reminds me of "God Save the Queen". A friend of mine preferred to remember it as "Here Comes The Bride". Perhaps one of the most famous examples is the letter "V". Ever since the Second World War it has been associated with the opening phrase of Beethoven's 5th symphony, "di-di-di-dah."

It is of course easier to learn Morse if you are in a group or if you have a friend to learn with. But there is no reason why you cannot learn on your own. Many times, I have heard of groups starting to learn together but as soon as one person starts to lag behind the rest, he will invariably drop out. But if you are learning on your own, you have the advantage of setting your own pace. A little self discipline and regular effort will soon produce results.

Numbers

Let us finally move on to numbers. Very often these are dismissed as being simple to learn and left to the last minute. The reason that many people seem to take this attitude is that numbers have a logical sequence of dits and dahs. Now, as I have repeatedly warned, counting dits and dahs is to be avoided at all costs. You must learn them as rhythms. Listed below are the ten codes necessary to be learnt in order to send and receive numbers.

1 di-dah-dah-dah-dah	**2** di-di-dah-dah-dah
3 di-di-di-dah-dah	**4** di-di-di-di-dah
5 di-di-di-di-dit	**6** dah-di-di-di-dit
7 dah-dah-di-di-dit	**8** dah-dah-dah-di-dit
9 dah-dah-dah-dah-dit	**0** dah-dah-dah-dah-dah

The temptation to try and learn the above by counting dits and dahs is obvious. Although some people manage to learn the figures in this way, ultimately they are forced to convert back to the rhythm method as they increase their speed. I would recommend that you adopt the correct procedure right from the outset. It will take longer initially, but will be the better method in the long run.

Now that you know both the letters and the figures, the battle is half won and we are ready to move on to the next stage.

CHAPTER 4

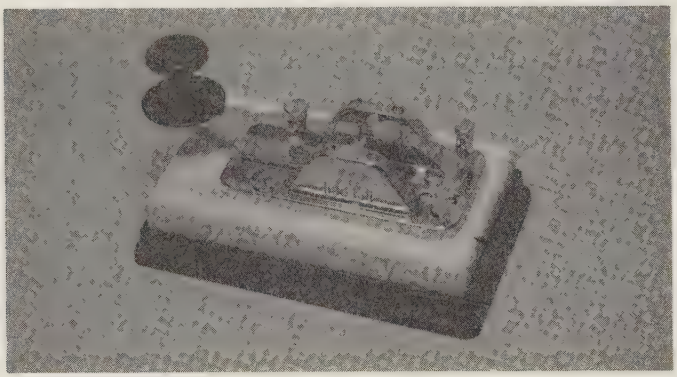
Receiving The Code

Having learnt the basic characters, let us now concentrate our efforts into actually receiving them. It is one thing to be able to look at a letter and recall the rhythm sound, it is quite another to approach it from the other direction and translate a rhythm sound back into a letter. The remainder of your period of learning will largely be taken up with simply practising this skill. It must be practised and practised so that both accuracy and speed are achieved. There are several ways of approaching this task and whichever method you choose will largely be dictated by your personal preference and finances available. However, all methods recommended here will eventually bring about the same result; a pass slip from the Morse code examining body. Let us therefore take a look at the various options available to you. But remember, whichever method you employ, follow the rhythm system of learning and you will achieve your goal.

The simplest and most basic way of learning the code is to listen to stations transmitting CW on the air. This is the method that a colleague of mine used some twenty five years ago and was the only option open to him at that time. The great problem with this method is that of finding stations sending slow enough Morse for you to copy in the early stages of learning. Most commercial stations will send at between 15 and 25 words per minute. Amateur stations can often be heard sending at somewhat slower speeds, but even these speeds are likely to be beyond the capability of the beginner. However, you will find that even when listening to stations sending at quite high speeds, you are able to pick out the odd letter. Many people have actually learnt the code by using this method. The longer they listen the more letters they are able to pick out. Eventually they find they can receive whole words and finally complete sentences.

One of the major problems of using "on-air" signals, is that of finding suitable transmissions. Many signals on the short wave bands are coded, and it is therefore difficult to know whether you have made any mistakes. Plain language is the best kind of transmission to look for in the early days of learning. Unfortunately, in these days of modern technology, many transmissions that were once sent in Morse code, now use RTTY systems for transmitting messages. The amateur bands are a good source for plain language signals, but even this has its problems. Many amateur radio cw transmissions leave a lot to be desired. The operator may be sending erratically or varying both speed and spaces between characters and words. This can be a positive hindrance to the student. As well as hindering progress, there is the real danger that the student may emulate this method of sending.

Modern technology has come to the aid of Morse code instruction in the form of electronic boxes that are programmed to send random code. These devices are capable of sending at a wide



A modern marble based Morse Key.

variety of speeds with varying spaces between characters. Several different models are manufactured to cater for most pockets. Their price in general, reflects their sophistication. If your budget is really tight, then you would do well to investigate the secondhand market. There should be a regular supply of these units available. Most owners would have little use for their electronic tutor once they have

passed the examination. Although some, however, would no doubt wish to keep them, in order to improve their sending speed over and above that required to pass the Morse test. Check with your local amateur radio dealer or the small advertisements in the specialist magazines.

Very often several members of a club may decide to start learning CW at the same time. This would provide them with the opportunity of purchasing a unit between them. Some of the larger clubs may even own their own tutors and be willing to rent them out to members.

For computer owners, there is the option of purchasing programmes that will send Morse code. These programmes vary in their complexity, but may well be a significantly cheaper alternative to that of purchasing a purpose built Morse tutor.

Using the D70 Morse Tutor.

Possibly the best known of the ready made items is the Datong D70 morse tutor. It is supplied complete and ready to use. It is battery powered and can therefore be used anywhere. Whilst not exactly pocket size, it can certainly be slipped into a brief case for practise during the lunch hour. Both an internal speaker and headphone outlet are included.

The portability of the D70 is a major advantage. Earlier it was suggested that you should be prepared to live, eat, sleep and breath Morse code. With a unit such as the D70 beside you, such an opportunity is provided. Because of the unit's popularity I will give a few hints on how to get the best out of this excellent device.

The D70 has three controls. These comprise on/off volume control, speed control, and a variable delay between characters. There is also a switch which enables you to select either letters of the alphabet, figures or a mixture of both. Do not use the latter option. You are not required to receive a mixture of letters and figures in the test so there would seem to be little point in inflicting unnecessary pain upon oneself! Keep to either letters or figures, for this is all that you will be required to do in your test. Leave the third option for building up your expertise after the test is over and you have your class A licence.

The second piece of advice is perhaps even more important than the first. Right from the beginning, set the speed control to 12 words per minute. This may seem strange at first. After all, how could you be expected to copy Morse code at this speed in the early

Datong D-70 Morse Tutor. Photo by permission of Datong Electronics Ltd

stages? The answer is to adjust the delay between characters to a time that is longer than normal. This will provide you with "thinking time". Remember, we are listening for rhythms or little tunes when receiving the code. If you set the tutor at too slow a speed, the sounds cease to have the rhythm and you will be tempted to count the dots and dashes (sorry!). Start as you mean to continue and keep the control firmly set in the 12 WPM position.The control that you should be adjusting is the delay control. As you progress with your practising, you will find that you are able to reduce the delay time between characters. At first set the delay to the longest possible and then gradually reduce it until there is virtually no delay at all save that which is normally allowed between characters. Remember, right at the beginning of this book we said that you must aim for instantaneous and automatic responses to the code.

Copy Errors - Ignore Them!

Now in the early days of learning you will inevitably miss the occasional letter because your brain is not able to translate this into a character before the next one is sent. This is quite common, and something we all experience. So here comes the next piece of advice. Do not dwell on this missed letter, dismiss it immediately from your mind and concentrate on the current one. Immediately you hear something you do not recognise put a full stop on the paper. If you do not train yourself to do this, you will not only miss the original character that caused you trouble, but the next few as well! Don't let yourself get into this habit as it is a difficult one to break and will hamper your progress, or worst still result in failure when taking your test. It is far easier to go back at the end of the test and fill in the gaps. As the test is sent in plain language, the missing letters are usually obvious and you are permitted to make corrections to your copy before handing it in. Trying to guess five letters in a row is not likely to prove very successful!

Here is a little example of putting dots down immediately a letter is missed. The text is typical of that which might be sent and although not a familiar piece of text, you would have no problem in filling in the missing letters.

The plan.t ea.th is in.abited by hu.ans

Now let us suppose that you have not followed the advice in these pages and have pondered over a missed character. You might have ended up with copy much the same as shown on the next page.

The pla a his in a ed by hv

Trying to correct this would be impossible unless you were endowed with more than the normal amount of luck! In this example the student missed several letters, got the word spacing wrong while he was thinking and guessed at one letter.

Determining the End of a Word.

In the early stages, you may well have trouble in hearing the difference in the gaps used between letters and the gaps used between words. This will not of course apply to electronic tutors as they are only capable of sending random letters or figures rather than passages of text. However, when receiving plain language, you will be faced with this problem. Do not worry too much about this, particularly in the early stages. A lot depends on the sender and some seem to leave bigger gaps than others. Once you become proficient and familiar with the code, you will find that you are able to easily discern the end of a word by the slightly larger gap than that which is left between letters. Should you experience this problem in the test, you can always put the spaces in afterwards as shown in the example below

The/planet/earth/is/inhabited/by/humans

Don't Anticipate.

The anticipation factor is another aspect that you must be aware of when practising your reception of code. Whilst you are receiving and writing down random letters, this problem does not arise. However, as soon as you begin to receive plain language, there is a tendency to anticipate or guess what is coming next .

Now I admire the experienced operator who can listen to Morse as you would the spoken word, without writing it down, but we lesser mortals have to write the received text down on paper as it

is received. The temptation to anticipate inevitably arises. You are so convinced that you know what the next letter or rest of the word is, you write it down ahead of the sender.

Let us look at a simple example. If we have already written down "th" then we might deduce from the way that the text is running, that the next letter will be "e" to complete the word "the." But the remainder of the word could well have been something else such as "an" or "ere," or any number of other possibilities. So always resist the temptation to guess what is coming next. If you do, and get it wrong, you will certainly miss the next three or four letters. All of a sudden you will have to start thinking, and all the time other letters will be coming at you. The end result is predictable! All along we have been trying to eliminate thinking altogether and cultivate an automatic response.

So the message is clear; never anticipate. The probabilities of being right are heavily stacked against you. Don't play the "fruit machine game"; wait until each character has been sent before writing it down. Do remember that the text you are sent during the test will not necessarily be simple text and will have no punctuation. This renders anticipation all the more dangerous.

Increasing Your Speed.

Hopefully it will not be too long before you have achieved the ability to copy the code at 12 words per minute with just the normal delay between characters. When you have reached that stage the time has arrived for you to increase the speed to about 15 WPM. At this point in your training, you may well find that you have to increase the delay between characters again, in order to obtain 100% copy. This is perfectly acceptable. Once you are able to read at this increased speed, you can gradually reduce the gap between individual letters. Ultimately, your goal should be 20 WPM. This may sound fast now, but you will be surprised how quickly you can increase your speed once you have mastered the code. You will also remember that in the early chapters we mentioned the part that nerves played in the test. Once you have achieved 20 WPM, 12 WPM will sound positively pedestrian. The fact that you are able to receive

at 20 WPM will help offset any susceptibility you may have to nerves on the day of the test. Sustained effort will enable you to achieve your target.

Progress Difficulties.

Unfortunately, the learning process is not all plain sailing. There will be times when you are convinced that you are making no progress at all. In some instances you may even think you are going backwards! We all experience this problem during our training. This "plateau" effect is one of the main reasons many students give for not staying the course. It is rather like the long distance runner who feels that he or she has reached a barrier but battles through the difficult period, to be rewarded with renewed strength. Others have claimed that they reach a certain stage and can go no further.

To a large degree, these problems are psychological and affect the less determined of us, to a greater extent. We are tackling a subject which is totally alien to us. Many of us may have not studied for anything since our school days. We are not used to intense study and are only too ready to find an excuse for giving up. The mind is looking for an excuse and any problem in learning is an ideal opportunity for the brain to say "I can't do any more". If you can be aware and appreciate this potential problem that you may encounter, then you are ideally equipped to overcome it. You may think that you are unique in suffering these setbacks; you are not!

The learning process is a gradual progression from raw beginner to expert. During this transition, you are continually setting yourself new targets. Set these targets too high or try to reach them too quickly, and you will slow your progress down. We all have different learning speeds and you must progress at the speed that suits you best. Regular practice in short bursts is far better than long sessions at infrequent intervals. 30 to 40 minutes per day is adequate to start with. You may feel that this is too short. It is not if it is done every day on a regular basis. You will be surprised how quickly you make progress if you follow this schedule. Increase it much beyond this time and you will find that after the initial surge of learning, your progress drops rapidly. The secret really is "little, but often".

An analogy can perhaps be made to one's attempt at obtaining a sun tan before leaving the somewhat temperate climate of the UK. Spend 30 minutes under the glare of an ultra violet sun lamp and nothing seems to have been achieved. This continues for a week or so and then all of a sudden one day you find you have a tan. But we all know what happens when you sit under the lamp for too long!

Nearer the examination you will find benefit in increasing the frequency of your practise sessions. You will even find they become fun. It will happen, and when it does, you will know that you have succeeded.

CHAPTER 5

Sending Morse

So far we have devoted all our time to the discussion of the recommended methods of learning to receive the code. We have not mentioned sending. You will recall that you were strongly advised to leave the key alone until you had mastered the reception of the code. There were very good reasons for this. But, understandably, you are anxious to progress to the next stage.

An often heard comment is that students claim they can easily send Morse but cannot read it so well. For some reason this seems to puzzle many, although a little thought will show that they are not unique. Anybody can send Morse at a faster speed than they can receive it. There is a very simple and logical explanation.

When we are receiving Morse our brain has to wait until the end of each character before it can know what the character is. Then the translation process takes place and we write the character down on our piece of paper. Unfortunately, whilst all this is happening the next letter is being sent and our poor brain has to move into overdrive to keep pace. In the early stages it doesn't! That is why we need so much practise in learning to receive the code.

The sending process is much easier on our brain. It has a distinct advantage. Our brain knows what the next letter is going to be before we actually send it. All we have to do is pump the Morse key up and down to the required rhythm, and meanwhile we are thinking ahead to the next letter. Little wonder then that we all find sending Morse code a lot easier than receiving it.

There is no doubt that if you can receive Morse code well, you will have little problem in sending it. Your regular training will have stood you in good stead, and you will have developed a rhyth-

mic technique that will make reception easy. Until you have reached this stage you are not ready to send. If you do attempt to send CW before you have mastered the code, you will almost certainly introduce into your sending some bad habits and poor rhythm. Like most bad habits, they are very difficult to break. In many cases you may not even realise your bad habits until it is mentioned or worse still, you find that others are having trouble in reading the passages you are sending.

Remember the little tunes that we discussed earlier, formed by each Morse character? Until you have learnt these you will not be in a position to send good Morse. So leave sending alone until you have mastered the art of receiving. Disregard the temptation and accept the advice learnt by many the hard way.

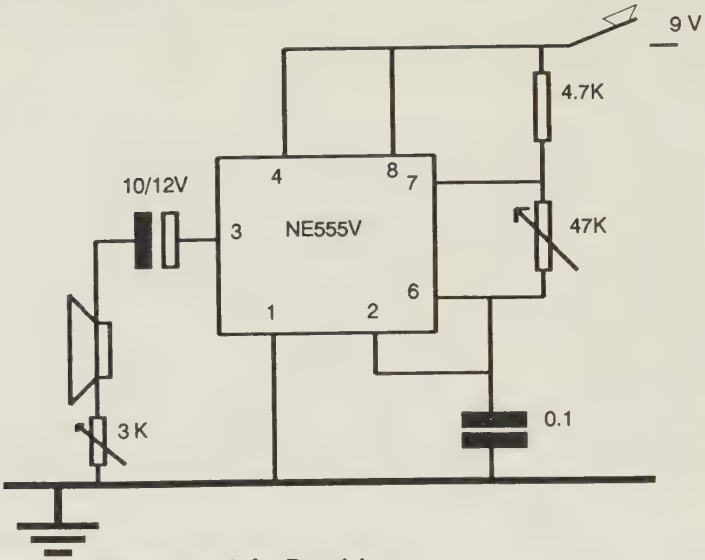
Essential Hardware.

Assuming that you have now reached the stage at which you are competent to send, you will need to obtain two vital pieces of hardware, a Morse key and an oscillator. The latter is necessary in order to monitor your keying. A circuit of a simple oscillator is shown overleaf and the necessary parts should be freely available.

The oscillator can either be purchased or built. The requirements are very modest and almost any oscillator will fulfil the job. However, avoid buzzers. Although very cheap, they are just not good enough for Morse tuition. They tend to have a slight time lag between the time the key is pressed down and the time that the buzzer sounds. Likewise, they also tend to overrun slightly after the key is raised.

So far as the actual key is concerned, it must be a manual one. This type of key is often refered to as a "straight key." Do not consider any other kind at this stage such as an electronic type or semi-automatic type. When you take your test you will be sending on a standard manual type. It follows that this is the type that you should carry out all your practising on. Keep paddles or automatic keys to one side until you are safely through the test. Trying to use them prior to this will serve no useful purpose and will inhibit your ability to send via a manual key.

Those of you who have purchased or borrowed the Datong D70 will find that it has a built-in practise oscillator. You simply need to plug your Morse key into the jack socket provided, thus avoiding the need for a separate oscillator.



Simple Oscillator Circuit for Practising

Interestingly enough, you are allowed to take your own key to the test with you provided it has a fly lead terminated in crocodile clips. The main reason for this is that there is a wide variation in the "feel" of Morse keys despite their similarity in appearance. In much the same way as two pianos may look the same, they feel totally different. Many people may be apprehensive about taking their test on a completely unfamiliar key.

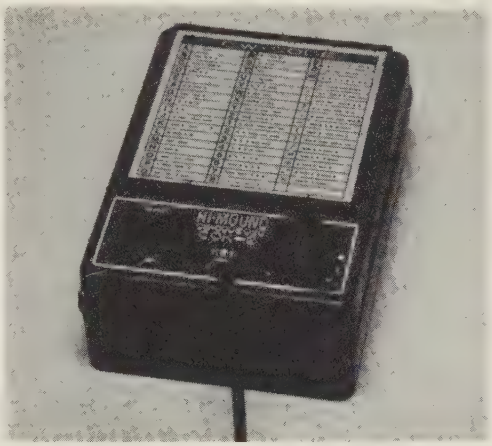
I decided not to take the test on my own key, although I must admit that I had considered the possibility. I had heard all sorts of tales about the keys used at the examination centres. It had been suggested that they were antiques and did not even resemble Morse keys. I must admit that when I entered the examination room and

saw the key, I certainly felt the younger of the two by a wide margin! Appearances are not everything, and it turned out to be one of the best keys I had ever used.

The old saying that a bad workman always blames his tools probably holds true in the context of the Morse examination. It is far easier to blame the key than your own lack of competence. In any case the choice is yours, but my feelings are that any tales about the quality of the Morse keys is completely unfounded.

Manual Key Techniques.

It may seem a little strange to talk about posture, but you will be quite surprised how this can have a marked affect on your ability as a CW operator. Correct posture is essential for good rhythm, speed and endurance.



Commercial Practice Oscillator COK-2

In many ways operating a Morse key is akin to playing a musical instrument. If you do not maintain the correct posture you will find that it is difficult to maintain your performance. You will particularly find that your ability to send at higher speeds becomes difficult. You will almost certainly find that you get tired very quickly with both your arm and back aching. In times gone by there was a term known as "glass arm." This described the condition whereby the arm suddenly goes rigid through fatigue making it almost impossible to maintain the original speed. To a great extent the introduction of automatic keys has overcome this problem. However, until you have passed your Morse test you must stick with a manual key! For this reason it is a good idea to get into the habit of adopting a good sending posture.

The key should be at right angles to the edge of the table. It should be placed in such a position that it is in line with your forearm. To find the correct position sit upright at the table and rest your sending arm comfortably on the table. For most of us this will mean that the edge of the table falls mid way between wrist and elbow. Some of you may find that you prefer the edge of the table nearer to your elbow. But whatever feels the most comfortable will be the correct position for you. Having established this position, the Morse key should be placed so that the handle is directly under the tips of the fingers.

The actual method of gripping the key varies between operators. The thumb is normally placed below the knob with the forefinger above it. Most people will find that they also need to place the next finger on the knob as well. Again, whatever feels best will be correct for you. The most important aspects are the position of arm, key and body. Sit upright in a comfortable position. Although your test will only last for a few minutes, you will hopefully maintain your Morse code and operate for far longer periods in the future.

Someone once said that the easiest way to adopt the correct posture and movement is to sit at the table with your arm resting on the table and tap the surface as you might do if you were impatiently waiting for something. This does seem to not only provide the right posture, but also gives the correct feeling of wrist action.

One of the most common mistakes when sending code is to have a rigid arm with the action coming from the elbow. Adopting this style means that your arm will have to be held above the surface of the table and will quickly result in fatigue. Try sitting at a table with your arm held an inch or so above the surface and see how long you can maintain that position. Not very long! Instead, rest the arm on the surface of the table with all the action coming from the wrist. Remember the analogy of tapping the table. This use of the wrist as against the forearm is important, and will ensure that you are able to maintain a good rhythm for long periods without fatigue.

"Echoing"

It almost goes without saying that accuracy is of prime importance in Morse code. Not only must the correct code be sent, the correct rhythm and spacing must be used to avoid ambiguity. There is nothing worse than listening to badly sent Morse and trying to interpret whether the operator sent two "E's" or one "I" etc. We can check our own rhythm by using morse tutors such as the D70. A method known as "echoing" can prove particularly useful in maintaining correct rhythm patterns.

To do this, set the D70 to 12 WPM but with a large gap between each letter in order that you may echo back the letter before the next one is sent. This really is an important part of learning if you are to become proficient at Morse.

It is surprising how easy it is to fall into bad sending habits. Even some of the older operators would do well to listen to letters correctly sent and then compare them with their own sending. It is quite astonishing how many operators have either learnt incorrectly or fallen into bad habits. In most cases the operators will have learnt Morse by the "dots and dashes" method. This once again underlines the importance of using the rhythm method.

Checking Your Sending

One idea that I found most useful was to make a tape of my sending. This has a number of uses. Firstly, it enables you to assess your present standard of sending. If you make a recording of a passage you can then play it back to yourself a few days later to see if you can read it. It might also be an idea to let an experienced operator hear it and have his comments on your performance.

I know that when I first tried this I was somewhat saddened to hear how poor my sending was. I had been concentrating on the code for each character and had not realised just how bad my rhythm had become. But the exercise proved useful and it helped to correct what would have otherwise gone unnoticed for some while. Others who have tried this method tell me that they were pleasantly surprised at the quality of their code. If you are satisfied with your sending and are in a group, it might be an idea for you to exchange tapes among yourselves in order that you may help one another. Per-

haps even a group assessment of one another's sending might be a worthwhile exercise. I must admit that I tried everything and anything I could to help me pass the examination.

"Fist" Variations.

However, whether you are learning in a group or on your own, you should listen to as much Morse as possible. This includes listening to different people's sending. Despite our attention to good sending there is inevitably a subtle variation in the way different operators send the code. This is colloquially known as "fist" variation. Many old timers will be familiar with this term. In the days when automatic keys were unknown, and everybody had to send manually, the more experienced could tell one operator from another by their "fist".

It is inevitable that this variation exists even among the professional operators. The examiner will be sending you Morse with a manual key. For this reason it is recommended that you make the effort to listen to a selection of different "fists". This should avoid any problems you might otherwise experience had you only been receiving Morse from one operator.

Listening to Morse "Off Air"

If you cannot find more than one person to send Morse to you, a shortwave receiver is a good alternative. You should not experience too much difficulty in finding Morse at almost any time of the day. Some of it will be sent at too fast a speed for you to copy. Much of it will be sent by automatic keys of one kind or another. Where it is being sent manually, you may find the occasional bad operator, particularly on the amateur bands. However, at this stage you will probably be experienced enough to tell the difference without being led into bad habits. Morse code is also sent on the VHF amateur bands, mainly on 144 MHz. However, it is very much a minority mode of operation on these frequencies although a number of class B licensees use these frequencies for practising at slow speeds. If you do look for Morse code on the VHF band, then do remember that you will need a receiver capable of receiving Morse

code. This is mentioned because many readers may be class B licensees with FM transceivers. These of course cannot be used for receiving Morse unless the transmission is tone-modulated FM.

RSGB Slow Morse Transmissions.

At this point it is worth mentioning the special slow Morse transmissions put out by the RSGB. This service is carried out by stations around the country, mainly on 144 MHz. A few stations transmit the service on the 1.8 and 3.5MHz bands and also 28MHz. The most popular frequency on VHF is 144.250Mhz. These slow Morse transmissions are put out every day of the week at various times. A full list of times and frequencies is available in the RSGB Call Book published every 6 months.

In many respects these slow Morse transmissions are very similar to the actual test and in some cases may actually be sent by an RSGB Morse Test examiner. Normally the transmissions start off with Morse being sent at quite slow speeds. The speed is gradually increased in steps at the beginning of each new passage until the final speed is well above the test requirement. At the end of each passage, the operator will read back the plain text and number sequences so that the recipient can check for accuracy. To make even better use of these transmissions, it might be a good idea to record them so that you can carry out further practise at a later date. In the main, this will only be useful for the faster speeds that at the time were beyond you. If you have been able to receive the main bulk of the text, then listening to it again as practise will be of limited value. It is quite surprising how much our memories can retain even when a passage has only been heard once.

Listening on the Short Wave Bands.

Listening to Morse code on the short wave bands is a good alternative and we have already discussed some of the pitfalls in employing this method of practise. It does, however, have other beneficial advantages.

Firstly, conditions on the HF bands are very variable, and fading, interference and weak signals are all features that we have to contend with. Whilst not the best environment for the beginner to

practise in, it does give the potential HF operator plenty of good experience under normal operating conditions. It is very unusual for CW signals to be devoid of interference. At times, the level of this QRM can be very high indeed. And yet it is surprising how tolerant our ears are to quite high levels of interference. In any case, these distractions are not a bad thing, as they will make the test seem even easier on the day. Using the HF bands as a source of practise transmissions will also make you aware of the operating procedures adopted when carrying out Morse code contacts with other stations. There are a wide selection of abbreviations used in cw operating and you will quickly become familiar with them. At the end of this book we provide you with a sample of a typical Morse contact between two amateur radio operators.

Remember, even when you have passed your Morse code test there are still many things to be learnt. You will also find that just as nerves are a consideration under examination conditions, so nerves will also play a part in your first few contacts on the air. In the same way as we recommended recording RSGB slow Morse transmissions, you may also consider recording other signals off air.

Later we shall be considering in a little more detail the various aspects that will affect you once you take your first steps on the HF bands. For now it is a case of practise, practise and more practise.

CHAPTER 6

Improving Your Speed

At this stage you should now have mastered the basic code and figures. You should also be able to read Morse at slow speeds with 100% copy. Now comes the next step; increasing your speed. There are two methods that you can employ in order to build up your speed. The first is to simply practise and practise. A method that will bring results eventually, but will take much longer than the second and preferred method. This latter method is one that has been tried and tested and will ensure that you make steady progress. The following advice will have you reading 20-24 words per minute with the minimum of effort.

Always listen to a faster speed than you can comfortably copy. Ignore this simple rule and you will hamper your progress. If you can copy 5 words per minute there is no point in practising at this speed. You are simply wasting your time. This may seem obvious but it is surprising how many students do just that. There seems little point in practising what you know you can already achieve.

Proceeding from this point, it is also recommended that once you can copy about 80% at a given speed, you increase your target speed. For example, if you can copy 80% of 8 words per minute, then you should increase your practise sessions to 10 words per minute.

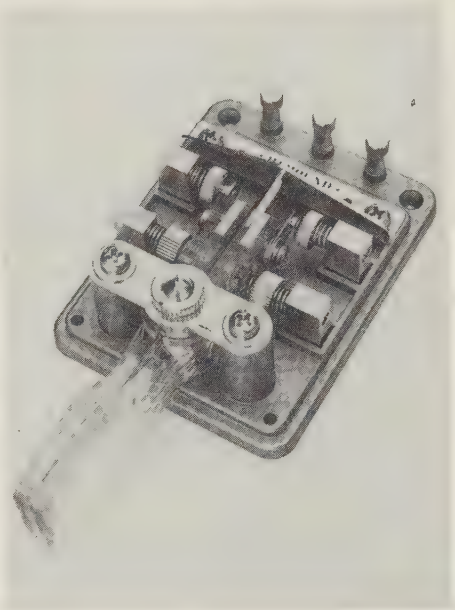
We have already touched on the "plateau effect," and in many respects this has proved to be a myth. However, it would be unfair to dismiss this entirely and it should be put into perspective.

When you go up from one speed to another you will initially find that you are copying very little. This is hardly surprising as your brain has got to move up a gear and get used to the shorter thinking

time. Every time you increase your speed, do remember the basic rule of not worrying over missed letters. If you have missed the letter, forget it immediately. Just put a dot where the letter should be or if you wish, simply leave a gap. As you get faster, this simple rule becomes more and more important. Failure to observe it will seriously hamper your progress.

What will surprise you is the way in which you can quickly adapt to the faster speed. The time from which you could receive very little at the new speed to the time when you can copy over 50% will be relatively short. Do not make these practise sessions too long. In fact, it is suggested that you make the initial passages of text sent to you as short as 30 seconds. At these higher speeds, you will find that fatigue sets in very quickly in the early stages and you will rapidly deteriorate from 50 or 60% copy to 20 or 30%. When this happens, take a rest.

Concentrate on accurate copy for short bursts at a time. As soon as your accuracy declines, this is the time to stop. After a rest you will find that you can again copy at your original percentage accuracy. If this method is employed you will find that you will make steady headway; both your percentage copy increasing and the time at which you can maintain this accuracy increasing.



Hi-Mound Morse Paddle key.
Photo: Lowe Electronics

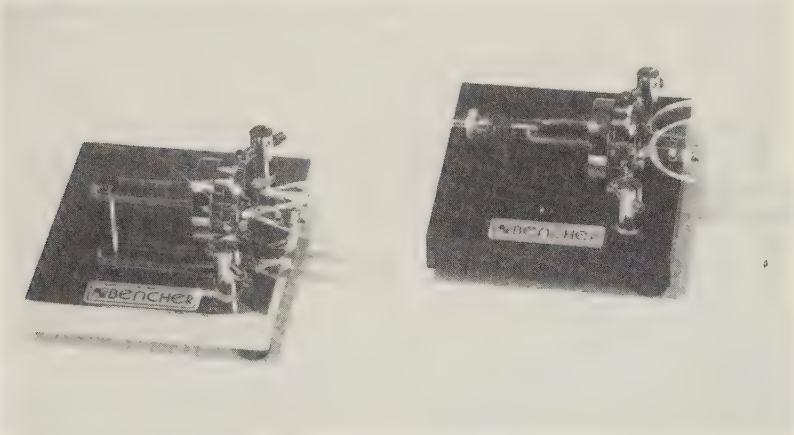
It is very easy for the mind to become "flooded" during practise sessions, particularly when you have only just increased your speed to the next level. The result is a kind of blank that seems to create a brick wall against any further progress. This is

the "plateau effect." It is not an inevitable occurrence but more likely results from our learning method. If you find yourself getting into this situation, take time out and have a rest. You may have been forcing yourself beyond your natural learning pace. Forget the problem and do something totally different. When you again return you will find yourself refreshed and ready to make new progress.

Do remember that Morse cannot be learnt in a few days. It is very akin to a foreign language. Albeit, far less complex. But unlike a foreign language, we have to be able to practise at higher and higher speeds. Your key to success must be a steady and determined effort, interspersed with sensible rest periods. In the early pages of this book we stressed the importance of regular daily practise. This advice still holds good once you have mastered the code and are trying to increase your speed. If, however, you find that everything is going wrong and you seem to be making no headway, leave the subject alone for a day or so and then return to it. You will find that this period of rest may be all you need in order to make your next step forward. Do not be tempted to extend this rest period beyond a day or so. If you do, you may find that you have actually lost some of your speed.

Daiwa Electronic Morse keyer.
Photo: Lowe Electronics

In our quest for increased speed, it is often surprising just how much progress is being made. This may not be evident at the time, but if you go back to your slower speeds where you could copy say 80%, you may be pleasantly surprised to find this approaching 100%. This is a great confidence booster and can be done every so often to check progress. Remember though, practising at slower speeds will not actually benefit you. Your greatest benefit will be realised by practising reading at speeds at which you have not yet accomplished 80% or more accuracy.



Bencher Paddle keys from USA.
Photo: Lowe Electronics.

To sum up this section of the book, we must learn that the greatest strides forward in building up speed are achieved by trying to receive at speeds that are beyond us. The very minimum you should be aiming for ultimately is 14 to 16 words per minute. If you can achieve this level of proficiency, you will find that when you drop back to 12 words a minute, it will seem extremely slow. In fact, many students find that after a high speed practise session, 12 words per minute is unbelievably slow!

Practising On VHF

Many readers will no doubt hold a class B licence or be in the process of obtaining one. These students will be delighted to know that they are now able to practise morse on the VHF bands including 70mHz & 50mHz, even though they have not passed the Morse test. This recent relaxation in regulations will be welcomed by many. It provides the chance to practise Morse with others in a similar situation, both receiving and sending. practise sessions should not be carried out in the areas of the bands designated for CW only operation, as this could cause undue interference. Instead, beginners are requested to confine their practise to those parts of the bands that are designated "multimode."

Operating CW on the air is a very good way of gaining confidence and makes practise more fun. It relieves the boredom and like many things, learning with others at a similar stage to yourself is a great asset. Again the inevitable warning must be given. Make sure that you do not let bad habits develop. During these practise sessions on the air you will be practising with students. Their standard of sending may not be as good as yours. For this reason, "on air" practise should still be supplemented with practise from an accomplished operator or an electronic tutor.

If you are not able to make use of the above facility you will be faced with making your own arrangements for tuition practise. Do not be frightened to ask around for somebody to help you. Many class A licensees will be only too delighted to assist. Make enquiries at the local club or ask at the local dealers. Even put up a card advertisement if the dealer has the facilities. Many students find that they are overwhelmed with offers of help. That is the way amateur radio is!

If you do have a local club in the vicinity, you would be well advised to join. There is a great deal to be gained by doing so, and of course you will find plenty of help and advice. You may well find that organised Morse classes already exist and if this is the case, you should take advantage of them. If they don't, then find out if other members are in a similar situation. If there are enough of you, one of the members may be willing to organise practise sessions. If there are not already practise sessions organised, it could be because nobody

has bothered to suggest it. You will inevitably find some people dropping out of these classes. This is normal, but do not be disheartened, if you have followed the advice in this book you will know that the key word is perseverance. If some members drop out, this should give you greater strength and determination to carry on.

Above all, remember that the learning period is only a few months. Better to get the whole thing completed in one go rather than make several abortive attempts that have come to nothing because of your lack of self motivation and discipline. What you are embarking on is something that will be with you for the rest of your life. A skill that many of your fellow enthusiasts have not got. Above all, your period of training should be enjoyable. Work can be enjoyable if approached in the correct manner, and the reward of obtaining your pass slip should be sufficient to keep you going during any periods of doubt you may have.

Revision

Once the letters and numbers have been learnt and you can read twelve words per minute you should commence a daily schedule similar to the following: 1) Receive three minutes of letters.

2) Receive one minute of numbers

3) Send three minutes of letters by "echoing."

4) Send one minute of numbers

5) Send three minutes of plain text.

6) Repeat the above schedule once.

This will take you about half an hour to complete and a few variations can be incorporated from time to time. Such variations could include listening to Morse off air or from an electronic tutor.

CHAPTER 7

The Test Itself

At long last your hard work and practise has paid off. You are now ready for the test. If you have followed all the advice that I have given so far, you should have little problem in passing.

The day before the test you will no doubt do some practise. Your practise at this stage should be simply to "keep your hand in". Do not carry it to an excess. At this late stage you should be well up to standard. If you are not, then no amount of practise on the day before is likely to be sufficient to get you through. Nerves apart, you should be feeling quite relaxed about your ability to meet the required standard.

Try not to arrive too early for the test. If you do you will have time to kill and find that all you have to do is to worry. If you do arrive early because of travel situations, then call into a restaurant for a cup of coffee, get yourself a newspaper or magazine, or something similar. Try not to think too much about the examination. I know it's something that is easier said than done, but if you can manage it, you will feel much more relaxed about the whole test. Whatever you do, do not arrive so late that you have to rush in without time to spare. Worse still, do not arrive late!

Aim to be at the examination centre about 15 minutes before the test. This will give you time to chat with the other candidates and relax a little. Its comforting to know that you are not the only one who is about to go through the ordeal! But do not be put off by the candidate who says "I hope it's not *so and so*, he fails everyone!"

Once seated in the chair at the table, suddenly it is too late to start worrying. When I took my test I felt as though I was cut off from the rest of the World. My only thoughts were what the examiner was saying and the sounds from his key. I actually took the examination at the Leicester Amateur Radio Show. I have heard some people say that shows and rallies are too noisy to take a Morse test. All I can say is that from my experience, I heard nothing whatsoever apart from the code. If there were any sounds I was not aware of them.

At this point it will probably be interesting to the reader to know exactly what to expect at the moment you step through the door into the examination room. The following therefore is a summary of my own experience when taking the examination in 1986.

"When I entered the examination room there were three people inside, other than the candidates. One person checked my Morse test application form and my identification documentation. Without some form of identification it is fairly easy for the less scrupulous to send somebody else in to take the test for them. The documents that I presented were my driving licence and my credit card. I could have produced my passport instead but as I normally don't carry this around with me, the other two documents were more convenient. This formality over with, it was down to business.

To my surprise, the examiner seemed quite normal, no sign of any horns or other attributes that would suggest he was anything other than mortal! First of all the examiner introduced himself and told us that he would send some Morse so that we could become acquainted with the sound we could expect in the test itself. I copied it all correctly and this helped me to relax and boosted my confidence. We were then ready to begin the test in earnest.

Plain text was sent to me at 12 words per minute. This sounded surprisingly slow, more like 8 to 10 words per minute. I felt sure it was not 12 words per minute but my nerves and mind seemed to be fighting each other and at times I felt stretched. My recommendation to learn Morse up to 16 words per minute or more was paying off. I felt sure that if my maximum speed capability had been only 12 words per minute I would have been in serious difficulty when under the pressure of the examination. At the end of the plain language passage I had managed to get everything down with no missed letters. I felt confident

that I had got everything right. Despite this, I carefully read everything through just in case I had made any silly mistakes. I was not going to risk a failure through not properly checking my copy. But I could find no mistakes and even my word breaks were in the correct places. I can honestly say that this was one of the few occasions I had copied everything correctly including word spacings. Usually I had no problem in copying the letters, but often at the end of the passage it was necessary to go back and make a few adjustments. Since taking the test, many other people have said that they too felt that they had fared better in the test than they would normally expect to do at home. Why this should be I do not know. Maybe the extra adrenalin helps or maybe the examiner really does send slower than 12 words per minute. Suffice to say that it seems to be a common experience.

Having satisfied myself that I had got everything right I looked around to see how the other candidates had coped. The gentleman opposite me seemed to have done about the same as me, although I couldn't know whether it was all correct or not. The lady next to him only looked as though she had achieved about 50%. I felt sorry for her. Either she had not worked hard enough or nerves had taken hold of her. What was certain was that she would not be passing the Morse test that day. However it was encouraging to see a female taking the Morse test, for they are still very much a minority on the HF bands. Ironically, the very first contact I had on CW was with a female operator!"

At this point in the test we were all asked to leave the examination room for a short while. We were then called in one by one for the sending section of the test. I would like to emphasise that at this point the examiner made me feel at ease. He suggested that I should do some practise sending. This was not part of the test, but simply to settle me down and enable me to accustom myself to the Morse key. When I was ready I was given the same passage to send as I had received. This I did with one error which I corrected. I was then given numbers to send; again I made one error which I corrected.

I had completed the test and I felt both relieved and pleased with my efforts. The examiner explained that he could not tell me the result there and then, but wished me well. I was not absolutely sure that I had passed but I felt very positive.

It was a long two weeks to wait before the result came through. During that time doubts started to enter my mind. Had I checked my receive copy properly? Had I made any uncorrected errors that I did not realise at the time? Looking back I realise all these thoughts were unfounded and this was confirmed when the results finally dropped through on to my door mat. I had passed!

It was one of the few examinations I had ever passed first time and I was very pleased with myself. Within an hour my licence application was in the post to the Department of Trade and Industry. Ten days later I received my new callsign. At last I could operate on the HF bands.

In retrospect I can only say that if the examination I took was typical, then you are treated very fairly by the examiner. Everything is done to make you feel at ease and you really should have no worries in this respect. I know that rumours abound regarding the poor treatment of candidates and the way in which they think their failure was due to the examiner rather than themselves. During the course of a week I meet many amateurs and I can honestly say that of all those that have passed the Morse test, not one has had a bad word to say about the examiner or the conditions under which the test was taken. The only bad comments I have ever heard have been from those that have failed the test or from third party sources. I think you can draw your own conclusions."

The above is a true account of my experience in taking the test during 1986. It is hoped that it will give the intending candidate some idea of what he or she may expect.

The official test requires that you receive 36 words of plain language in three minutes with a maximum of 4 errors. You are also required to receive 10 groups of 5 figures in 1 & 1/2 minutes with a maximum of 2 errors.

The sending requirements are similar. Again you are permitted to make 4 mistakes in sending plain language and 2 mistakes in sending groups of figures. The main difference being that you are not allowed any uncorrected errors.

A mistake during sending is normally acknowledged by sending a series of dots, normally 8. It is not unusual to make the odd mistake when sending. Normally the errors occur because you accidentally sent a poor character; not because you are unsure of the code! These mistakes (up to the limit) are treated in much the same way as if you had stalled your car during your driving test. If you do make a mistake, remember this will have no effect on your result providing you take the correct procedure. Send your error code and go back to the beginning of the word or group of figures and send them again.

Finally, do remember that the examiner is in the business of passing candidates. He is not trying to catch you out. All you need to do is to prove to him that you have attained the necessary standard in order to be granted a class A Amateur Radio licence.

CHAPTER 8

Other Information

We have now covered the basic requirements for learning Morse code. You should, by now have a good grasp of the code and be well on your way to 12 WPM or more. In this final chapter of the main section of this book, I will cover a number of additional topics that you will find both useful whilst you are learning, and also after you have passed your test.

Additional Reading

There are a number of other books on the subject that have looked at somewhat different aspects of learning Morse. All in their own way can be helpful to the student.

One of the most useful little books covering Morse code is published by the RSGB under the title of "Morse Code for The Radio Amateur" by Margaret Mills, G3ACC. This book contains many passages to practice receiving and sending, as well as random groups of letters. These random groups are particularly helpful as they are composed in such a way, that if they are not sent with correct spacings between letters, the code sent could be incorrectly interpreted. I used this book a great deal and found that the sample passages for sending provided very useful practice. You would be well advised to obtain a copy of this book so that you can improve your sending. In fact passages out of this book are often used by the RSGB Morse transmissions on the air for practice.

Another book available on the subject, this time from the publishers of Practical Wireless magazine, is "Introducing Morse." It is a very low cost booklet that represents extremely good value. The

main body of the publication provides circuit details of a number of practical devices of particular interest to the Morse code operator. If you are a keen constructor, you will find much to interest you. The simple oscillator is something that is probably within the capability of almost anybody. I built one and now use it regularly as a continuity tester! For the more advanced constructor there is an electronic Morse generator, several electronic keyers, some information regarding computers and Morse code, and a notch filter for improving the reception of signals from your short wave receiver.

Spacing Between Words & Characters

The question of what is the correct spacing between words is something that is often asked by the beginner. Officially, the space between two words should be seven dits. Now this is something that is not too easy to judge, and I doubt that many operators even know what the "ideal" space is. When I was learning Morse I was taught to follow the following method:

Hold the Morse key in the normal manner with the thumb underneath and the first two fingers on the top. Then extend your little finger as if you were holding a cup of tea. When you come to the end of a word, bend or rock your wrist so that your finger touches the table. The time taken to do this and return your finger to its original position will provide the right gap at a sending speed of 12 words a minute.

This is a somewhat unusual method of providing a rough "rule of thumb" indication but it does work. Once you progress to faster speeds, this method would no longer provide the correct space. The actual break has to be relative to the speed that you are sending at. This is the reason for the seven dit recommendation. An alternative is to remember how long the break is between characters, and then allow just a shade longer than this. Either one of the above methods should provide you with the required pause between words.

I have never actually heard of anybody failing the test through poor spacing of characters or words. However, this should be no excuse for not giving this part of the skill the proper attention it deserves. Interestingly enough, I have also never heard of anybody failing because they have been sending too slowly!

Spacing Between "Dits" & "Dahs"

Another matter that students often enquire about is the spacing between dits and dahs and the spacing between letters. The recommendation for the former is one dit and for the latter, two dits. Both these spaces seem to come naturally and it is only the space between words that really can cause problems. However it must be admitted that there are students and licensed amateurs who have anything but perfect spacing between letters.

Clearly, it is not possible to accurately judge these gaps. But in all cases of poor sending where spacing has been the problem, attention to the rhythm pattern has resulted in a marked improvement. In other words, if you can instil in yourself in your early days of learning a correct sense of rhythm, then this problem should not arise.

Self-Tuition - Morse Talkers.

Many of those that want to learn the code seem to think or have been told that it is not possible to learn it on ones own. Undoubtedly, there are those for which communal tuition is the best solution for speedy learning. The reason for this seems to be that some students do not have the willpower to learn on their own. Others find that the element of competitiveness that can occur when

Microwave Modules MMS-2 Morse Talker.
Photo: Microwave Modules

studying with others is a spur to their efforts. Despite this, many people do manage to learn the code on their own without any help whatsoever from outside sources. Such people either use electronic teaching aids or listen on their receivers for any random Morse code transmissions.

I have already discussed the Datong D70 Morse tutor at length in chapter 4, showing how it can be used to aid both the initial learning and subsequent practise. But this is not the only electronic teaching aid; there are several others. One such device is the Morse talker. Owing its birth to the availability of computer chips that can generate synthesised speech, this instrument can prove a great help in learning Morse.

The Morse talker, as its name suggests, is an instrument that is capable of generating both Morse code and speech. It can fulfil two functions. The first is to send short passages of random code and then repeat back to you in speech, the different characters that it has sent. The second, and more advanced unit can not only do all this, but can also read back to you the code that you send to it. The most popular models in the UK are those made by Microwave Modules. Two models are available, namely the MMS1 and the MMS2. To many, the higher cash outlay in order to purchase one of these units is something that is hard to justify. Most owners of these devices only need them for a few months and then dispose of them. For this reason, it should be possible to find them on the second hand market. There is very little that can go wrong with them so it makes sense to investigate this avenue.

The Microwave Modules versions of these are housed in black boxes that require the external connection of 9-15 volts DC. Each unit has six ranges from which random Morse can be generated. The characters covered in each range are A to F; A to M; A to U; A to Z; 0 to 9; and 0 to Z. This permits the user to initially learn the first few letters of the alphabet and then progress in steps until the complete alphabet is learnt. Once this has been mastered, you can then progress on to numbers and finally random numbers and letters. As I mentioned earlier in this book, the generation of mixed numbers and letters is somewhat academic as these do not feature in the test. However, during contacts with fellow radio amateurs,

both numbers and text will be freely mixed, so it is something to be practised after you have passed the test, or at least, reached the test standard.

Your first experience of receiving mixed characters will be in the sending and receiving of callsigns. Strangely enough, this usually poses very few problems, mainly because you know roughly when to expect the numbers and alphabet characters. However, receiving both text and numbers at random is something that is a lot more difficult. Fortunately, we as amateurs are only interested in communicating in plain language. Under these conditions it is usually obvious when numbers are going to be sent.

Another feature of the Morse Talker is its ability to send varying lengths of random code. It has four set lengths. These being, one letter, five letters, fifty letters and continuous. The latter being ideal if you can't sleep! For obvious reasons the talkback facility is turned off when the unit is set to the continuous mode. In the early stages you will probably find that five characters at a time is all that you can cope with. Fortunately, progressing to 50 letters is not too difficult as they are sent in 10 groups of 5. Unless you wish to punish yourself, there seems little point in using the continuous mode.

The Morse Talker sends at a wide range of speeds, extending from 2 - 20 words per minute on the MMS-1 and 6-32 words per minute on the MMS-2. The speed is selected in 2 wpm increments. A useful feature is a tape recording socket on the rear of the case. This enables you to record random code passages for listening in the car or on a personal cassette player. The internal oscillator can also be used for practise sending by plugging a morse key into the socket provided. The main difference between the MMS1 and the MMS2, apart from speed, is that the latter has the additional ability to read back characters you key into it, and also read out your sending speed. Undoubtedly, the speech facility comes in very useful. One of the problems you have in the early days of learning is that of knowing whether you have copied the random code correctly or not. The ability of the unit to read it back to you is a welcome feature.

The ability to also read the morse that you send back to it is another nice feature. It is a peculiarity of electronic Morse code devices that they are only happy with near perfect Morse. Poor spacing between letters or code symbols is something that they have very

little accommodation for. In other words, if your spacing is not correct the machine will not interpret your code correctly. For this reason the unit can quickly show whether you are adopting the correct rhythm or not. In the early days you will almost certainly not have perfected your rhythm and the code read back to you will confirm this. Generally speaking the very slow speeds should be avoided because of the difficulty of applying rhythm techniques at such a slow pace.

Morse Code "Readers"

This chapter would not be complete without reference to a piece of equipment which is now widely available; the "CW READER." Many versions are available with widely differing levels of sophistication and features. In its basic form, the instrument is con-

A Selection of Morse/RTTY Readers.
Photo: Lowe Electronics.

nected to the audio output of any communications receiver and the resultant audio pulses are decoded into text which is then fed to a convenient video monitor.

Let me say at the outset, that these instruments can never match the skill of a good cw operator. His is a skill which can adapt to the widely varying speeds and quality of CW as well as the almost

inevitable interference that is ever present in varying degrees on our short-wave radio bands. As a student of CW the device will serve you no useful purpose as far as reception is concerned, and should only be regarded as an operating aid for those who cannot read cw. Many short-wave listeners fall into this category and they probably account for the major portion of the market.

Most of the currently produced units are not only capable of reading Morse code; they can also read RTTY and TOR transmissions. It is probably for these latter two modes that most enthusiasts will purchase the equipment. As this book is aimed solely at the potential CW operator we will confine our remarks to the CW features of the equipment.

Morse "readers" can accommodate a wide range of speeds and most will handle speeds well in excess of the average operator's ability. Some units have a coarse speed setting for slow and fast Morse code, but in general they are self- adjusting. Many, have a built-in LCD display that enables small portions of text to be displayed if a monitor screen is not available. There is, unfortunately, one major drawback that affects all machines to a varying degree; they can only cope with near perfect Morse code. If the transmitting station is using an electronic key, then the Morse Reader will have no problem in decoding the signals. If, however, the transmitting station is sending manually, any sloppy operating and poor spacing will fool the machine into displaying rubbish on the screen. Some of the more recent designs have become a lot more tolerant in this respect, but none of them have the built-in flexibility and adaptability of the human brain in dealing with all these variations. Any potential purchaser should be aware of these limitations when purchasing a unit solely to decode CW signals.

Nevertheless, certain models of Morse Readers do have an application that is of interest to the student. Some of the models have the facility for plugging a Morse key into an accessory jack socket. The student can then send passages of text and these will displayed on the screen. It it is then a simple matter of checking on the screen to assess your accuracy. Again, the warning mentioned above must be heeded; the machine will only produce true copy when the

cw sent to it is near perfect. In many ways this can be turned to your advantage, for it will quickly highlight even minor shortcomings in your sending.

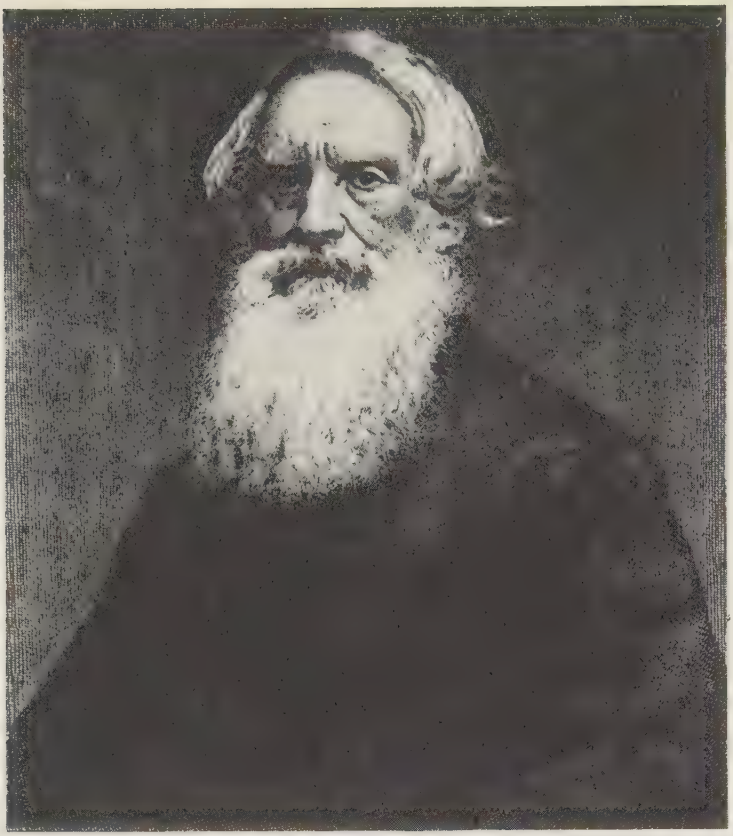
Some models also have the facility for generating random Morse code which can be copied and then checked back with the screen. A few have output connectors for printers so that both generated and received Morse signals can be permanently recorded.

Although Morse Readers are far more expensive than the simple electronic tutors, they do have the added advantage of providing reception of signals other than Morse code such as RTTY and TOR. Thus, once you have passed your Morse test, you do not have to discard them. Plugging one of these devices into the output of your communications receiver and hunting around the vast number of RTTY transmissions will keep you fascinated for hours!

And Finally- - - -

The Morse test is valid for life so it is worthwhile making the effort safe in the knowledge that once you have passed you need never touch a morse key again. I hope however that the encouragement and advice I have tried to convey within these pages will at least make you want to keep your "hand in". The wonderful thing about Morse is that even if you have not used it for many years, it very easily comes back to you.

Finally, I will wish you the very best of luck in your quest to learn and pass the Morse code test. This book is not intended to be a literary masterpiece, simply a helping hand to the newcomer to the Morse code. Please feel free to write to me care of the publishers and let me know your experiences in learning the code. Such information will I am sure be of interest to many other people, and hopefully some of your comments and ideas can be included in a future edition.



Samuel Morse Reproduced by permission of the Trustees of The Science Museum

Last but not least, let us toast Samuel F.B. Morse who invented and refined a method of communication which is still unequalled in its simplicity and effectiveness.

APPENDIX-A

The Complete Code

A di-dah
B dah-di-di-dit
C dah-di-dah-dit
D dah-di-dit
E dit
F di-di-dah-dit
G dah-dah-dit
H di-di-di-dit
I di-dit
J di-dah-dah-dah
K dah-di-dah
L di-dah-di-dit
M dah-dah
N dah-dit
O dah-dah-dah
P di-dah-dah-dit
Q dah-dah-di-dah
R di-dah-dit
S di-di-dit
T dah
U di-di-dah
V di-di-di-dah
W di-dah-dah
X dah-di-di-dah
Y dah-di-dah-dah
Z dah-dah-di-dit

Punctuation

Full stop	di-dah-di-dah-di-dah
Comma	dah-dah-di-di-dah-dah
Colon	dah-dah-dah-di-di-dit
Question mark	di-di-dah-dah-di-dit
Apostrophe	di-dah-dah-dah-dah-dit
Hyphen or dash	dah-di-di-di-di-dah
Fraction bar	dah-di-di-dah-dit
Open brackets	dah-di-dah-dah-dit
Close brackets	dah-di-dah-dah-di-dah
Double hyphen	dah-di-di-di-dah
Quotation marks	di-dah-di-di-dah-dit
Error	di-di-di-di-di-di-di-dit

Numbers

1	di-dah-dah-dah-dah
2	di-di-dah-dah-dah
3	di-di-di-dah-dah
4	di-di-di-di-dah
5	di-di-di-di-dit
6	dah-di-di-di-dit
7	dah-dah-di-di-dit
8	dah-dah-dah-di-dit
9	dah-dah-dah-dah-dit
0	dah-dah-dah-dah-dah

APPENDIX-B

International Q Code.

The International "Q" code has been used for many years by commercial operators. It is a series of codes that represent abbreviations for phrases, and is extensively used in CW operation to speed up communications and overcome language barriers that might otherwise exist between operators of different nationalities. Many of the codes have been adopted by amateur radio operators for use in their day to day contacts and some of the original definitions now have a slightly different meaning when used in this context. Below is a comprehensive, but by no means complete, list of "Q" codes.

QRA	What is the name of your station?
QRB	About how far are you from my station?
QRG	Exact frequency
QRH	Does my frequency vary?
QRI	Tone of transmission
QRK	Signal strength
QRL	Are you busy/is this frequency in use?
QRM	Interference from other stations
QRN	Interference from static
QRO	High power
QRP	Low power

QRQ	Send faster
QRR	Are you ready for automatic operation?
QRS	Send slower
QRT	Closing down
QRU	Have you anything for me?/I have nothing further.
QRV	Are you ready?
QRW	Shall I tell.....that you are calling him on .....mHz
QRX	Stand by/when will you call me again?
QRZ	Who is calling me?
QSA	What is my signal strength?
QSB	Fading
QSD	Am I sending badly?
QSI	I have been unable to break in on your transmissions
QSK	Can you hear me between your signals and if so can I break in on your transmission?
QSL	Confirmation of contact by card
QSN	Did you hear me on ....mHz?
QSO	Contact between stations
QSP	Relay message
QSR	Shall I repeat the call on the calling frequency?
QSS	What working frequency will you use?
QSU	Shall I reply on this frequency?
QSV	Shall I send a series of V's?
QSW	Will you send on this frequency?
QSX	Will you listen to.....on.....mHz
QSY	Change frequency

QSZ	Shall I send everything twice?
QTH	What is your location?/My location is....
QTQ	Can you communicate with me using the international code of signals?
QTA	What is the time?
QTS	Will you send your callsign for tuning purposes?
QTV	Shall I stand guard for you on frequency.....?
QTX	Will you keep your station open for further communications until.....
QUA	Have you news of.....?
QUM	May I resume normal working?

The Q code can also be used to ask the question the other way round if followed by a question mark. For example "QSZ," "shall I send everything twice?" could be "QSZ?" "will you send everything twice."

The beauty of the code is that it is an international language so a good knowledge of it will allow you to communicate with any country. Some of the codes are more commonly used than others to the extent that a few are now everyday language on both 'phone and CW.

RST Code

You will no doubt be familiar with the "Readability and Strength" codes universally used in amateur radio, but you may not be familiar with the "Tone" part of the report. To a great extent this is now redundant because most signals can be fairly described as "T9." However, the full code is listed below and if you should receive a code less than "T9," it is worth checking your transmitter.

Tone

T1	Extremely rough hissing note
T2	Very rough AC note, no trace of musicality.
T3	Rough, low pitched AC note, slightly musical
T4	Rather rough AC note, moderately musical.
T5	Musically modulated note.
T6	Modulated note slight trace of whistle.
T7	Near DC note, smooth ripple.
T8	Good DC note, just a trace of ripple.
T9	Purest DC note.

Abbreviations

Now that you have passed the morse test, working on air is different again. If you listened to amateurs sending morse you will probably be aware of a lot of abbreviations already. Listed below are the most common forms to help you over the hurdle of your first few contacts.

AA	All after
AB	All before
ABT	About

ADR	Address
AGN	Again
ANI	Any
ANT	Aerial
AR	End of transmission
AS	Wait
BA	Buffer amplifier
BC	Broadcast
BCI	Broadcast interference
BCL	Broadcast listener
BCNU	Be sceing you
B4	Before
BD	Bad
BFO	Beat frequency oscillator
BK	Break
BLV	Believe
BN	Between
BT	Sent to determine one part of transmission from another
BUG	Semi-automatic key
C	Yes
CANS	Headphones
CC	Crystal controlled
CFM	Confirm
CK	Check
CL	I am closing down my station
CLD	Called

CNT	Cannot
CO	Crystal oscillator
CONDX	Conditions
CPSE	Counterpoise
CQ	General call to all stations
CRD	Card
CT	Start sending - commence traffic
CUD	Could
CUAGN	See you again
CUL	See you later
CW	Continuous wave
DE	From and the station called
DF	Direction finding
DR	Dear
DX	Long distance
DXCC	DX century club
ELBUG	Electronic key
ENUF	Enough
ER	Here
ES	And
FB	Fine business
FM	Frequency modulation
FER	For
FONE	Telephone
FREQ	Frequency
GA	Good afternoon or go ahead
GB	Goodbye

GD	Goodday
GE	Good evening
GG	Going
GLD	Glad
GM	Good morning
GN	Good night
GND	Ground
GUD	Good
HAM	Amateur transmitter
HI	Laughter
HPE	Hope
HR	Hear or here
HRD	Heard
HVE	Have
HVY	Heavy
HW	How
IARU	International Amateur Radio Union
II	Repetition Signal
INPT	Input
K	Invitation to transmit
KA	Starting signal
KN	Invitation for named station to transmit
LID	Poor operator (USA Term)
LOC	Locator
LSN	Listen
MNI	Many
MOD	Modulation

MSG	Message
MTR	Metres
NBFM	Narrow band frequency modulation
NW	Now
NR	Number
OB	Old boy
OG	Old girl
OC	Old chap
OM	Old man
OP	Operator
OT	Old timer
PA	Power amplifier
PSE	Please
PWR	Power
R	Received
RAOTA	Radio Amateurs Old Timers Association
RCC	Rag Chewers Club
RCVR	Receiver
RPRT	Report
RPT	Repeat or Repeater
RX	Receiver
SA	Say
SED	Said
SIG	Signal
SKED	Schedule
SN	Soon
SRI	Sorry

SSB	Single Sideband
STN	Station
SUM	Some
SW	Short Wave
SWL	Short Wave Listener
TFC	Traffic
THRO	Through
TKS	Thanks
TMW	Tomorrow
TNX	Thanks
TRX	Transceiver
TU	Thank you
TVI	Television Interference
TX	Transmitter
U	You
UR	Your
URS	Yours
VA	End of work
VFO	Variable Frequency Oscillator
VY	Very
W	Watts or words
WA	Word after
WB	Word before
WAB	Worked All Britain
WAC	Worked All Continents
WID	With
WKD	Worked

WKG	Working
WL	Well or Will
WUD	Would
WX	Weather
XMTR	Transmitter
XYL	Wife
XTAL	Crystal
YF	Wife
YL	Young Lady
73	Best Regards
88	Love and Kisses

APPENDIX-C

SAMPLE CW QSO

Even after you have passed your Morse test you may still not be familiar with the way in which a Morse contact is carried out. Although there are no set rules, there is a general format for carrying out cw contacts on our amateur radio bands. The sample that follows is intended as a general guideline and you will find that most radio contacts you make will be a variation on this general layout. In particular, the beginning and ends of most cw contacts seem to be very close to the example given.

Some regard their first Morse contact with almost the same fear as they did their Morse test. However, if you have been able to listen to some typical QSO's on the air you will have some idea of the procedure. You will also find that most UK operators will know that you are a newcomer to CW by virtue of your callsign. As a consequence they will make allowances for your errors and requests for repeats of any information you have missed. Do not be frightened to ask the station you are in contact with to send slower if you find the speed too great. As a general rule the operator should slow down to your speed without you having to request it. Perhaps a little anecdote that was related to me by a well known amateur will be of interest.

The operator was making his first cw contact on 160 metres and had received a reply to a CQ. All was going well until he came to receive the transmission from the other station. After a minute or so, he was copying very little because of nerves and because the station was sending too fast for him to read. In retrospect, he realised

that the station was only sending at the same speed as himself. He had made the classic mistake of sending at a speed that was beyond his own reading ability. Having found himself in this situation he panicked, switched off the equipment whilst the other station was transmitting, and went down to the local pub! Quite how long the poor operator at the other end was transmitting for before he realised that he was communicating with no one, we shall never know. However, this tale does serve as a warning, that if you send fast, you must expect the other operator to come back at you at the same speed.

CQ CQ CQ DE G0GBY G0GBY CQ CQ DE G0GBY G0GBY AR K

G0GBY G0GBY DE G3OJV G3OJV AR K

CT G3OJV DE G0GBY TNX FOR CALL UR RST 479 NAME MARK ES QTH BASILDON HW CPY ? AR G3OJV DE G0GBY

CT GOGBY DE G3OJV R ALL OK NAME HR IS PETER ES QTH IS HAWKWELL UR RST IS 579 MY RIG IS TS530 ES ANT IS DIPOLE WELCOME TO HF BANDS ES GUD TO SEE U PASSED UR MORSE TEST WILL SEND YOU A CARD VIA THE BUREAU OK ? AR G0GBY DE G3OJV

CT G3OJV DE G0GBY R CARD OK VIA BUREAU TNX WILL SEND YOU CARD TOO RIG HR IS FT101ZD ES ANT IS CP5 NW QRU SO TNX MARK FOR QSO ES CUAGN 73 AR G30JV DE G0GBY

CT GOGBY DE G3OJV R OK MNI TNX FOR QSO ES GUD LUCK ON HF 73 BCNU AR G0GBY DE G3OJV VA

The above may not look very much when written down, but during your first few QSO's it will probably be quite enough. As time goes on and you become more experienced you will find your contacts become longer and more conversational. Many overseas stations probably only have a limited knowledge of English and in these cases you will find the contacts are inevitably short. However, listen to some of the contacts at the bottom of 80 metres betwen G stations and you will find that they are communicating at speeds of 25 to 30 words per minute in normal conversational terms. They probably get as much information across to each other as some of the more long winded 'phone operators do in the same amount of time!

APPENDIX-D

Additional practise for Sending.

The following series of words have been provided to assist in the achievement of correct spacing between letters. It is very easy for the words to be misread if the rhythm or spacing is much less than perfect. Try making a recording of your sending and then try reading it back at a later date to check your sending accuracy. Alternatively, get an experienced operator to listen to you, or if you are in a group, try sending to the rest of the members.

BISON	CHICKEN	TUITION
AEROPLANE	MARGIN	FINEST
TAWNY	BISCUIT	AWAKE
DUTCH	MARQUEE	MOTOR
TOMATO	MOTHER	HOISTS
REFERENCE	PANAMA	MAGGOT
REMEMBER	CANNOT	AILMENT
YUKKA	XANADU	DETERMINE
NIGHTS	BITS	BANANA
ARREARS	BLASTS	CAKE
FUSION	FINE	QUAKER
MITTEN	YAWN	TEAT

TRANSFER	ENFORCE	AERIAL
DOGMATIC	MATTER	KENNY
PEANUT	NAMED	TENTS
MOANER	REFER	TIMID
FORGOT	MISTER	MILITANT
VESTED	MISTRESS	WATER
WAIL	NORMANDY	STOVE
ELSIE	NEON	PANCAKE
TUXEDO	WOMEN	JILTED
MESH	VICTORY	NIGHTS
STRIVE	QUEEN	EXTRA
PIECES	BUTTER	GLOVE
TIDY	TENANT	JETTY
STUBBORN	VARIOUS	ATTACK
KATY	TAME	JAMES
BIAS	RAVINE	PANIC
UNITED	LIED	SMOTHER
TAKEN	ENRICH	ENVISAGE
LINAMENT	TRANSFER	USEFUL
MONITOR	CELERY	EXPECT
ENLIVEN	GEORGE	RIVER

DENTED	WRECK	JEALOUS
SCOPE	MIGRAINE	MAKER
MIAMI	ZELDA	WEEPY
TIDY	DITTO	CONTRACT
POLITICS	LADY	WATER
INDENT	THOSE	JOUST
TEETH	NEITHER	LILAC
TWISTY	TIRO	LATTER
HECKLE	MEWS	TANTRUM
NUTMEG	DICTION	REACT
BEASTS	SOOTY	AVENUE
JUMBO	ZEBRA	EXHIBIT
61616		49494
78787		37373
50505		28282

Finally here is a little extra passage that is good practise in both sending and receiving.

On his mississippi mission the mist made a shishing noise in the whistling wind.

APPENDIX-E

SAMPLE TESTS

In this section I have set out some test examples for you to practice. Each of these examples reflects the kind of test you are likely to be set when you take your test. Each test has been specially prepared so that if each passage of plain text is sent within 3 minutes and each group of figures in 1 & 1/2 minutes, it will equate to a speed of 12 words per minute.

The exact timing does not have to be precise. The passages are simply set as a means of practising and checking for accuracy bearing in mind the examination limitations regarding permissible errors. At this stage of your learning, speed should be no problem and you will probably find that you tend to send the passages in less than the "target" time. It is a useful exercise, however, to try sending one of the test samples as close to the "target" time as possible in order to get the "feel" for a 12 words per minute speed.

Diligent practice of these tests should help you become familiar with the typical test pattern you will be set on the day of your examination. All punctuation has been omitted in order to reflect examination conditions.

Finally, any test passages such as these are quickly learnt and they can only really be used realistically once or twice. For this reason it is recommended that you do not attempt these exercises until you are approaching the test.

SAMPLE TEST 1

Kind amateur radio enthusiasts are found over the world joining america to zaire not forgetting mexico and quebec perhaps if there were more licenses there would be greater harmony amongst the different nations.

21035	31909
24716	47958
65288	03615
17783	24708
40592	36249

SAMPLE TEST 2

Scanning receivers are a recent innovation in radio communications their main attraction is not just an amazingly wide frequency coverage but excellent sensitivity keyboard entry control allows operating advantages.

96412	94100
13820	65830
87749	83152
02635	25730
79685	76449

SAMPLE TEST 3

An accurate frequency measuring device is just one kind of item necessary to remain within the licensing regulations these are not a maze of rules only sensible precautions for avoiding any extra spurious emissions.

61907 61445
92833 52834
17069 68025
30824 91735
27781 54069

SAMPLE TEST 4

Radio exhibitions are as popular as ever joining their ranks are all sorts of dealers with a more than adequate supply of equipment can you afford not to go and miss the crazy offers and special events that are to be found

37605 90468
74631 87456
85409 23360
37850 85124
17929 12291

SAMPLE TEST 5

Just over a quarter of my garden is taken up by flower beds my favourite plants are roses which make an excellent informal hedge there are trees such as witch hazel and lilac many different species make a good display

16283 58047
37290 47815
51734 50964
06835 02839
91264 69172

SAMPLE TEST 6

Collecting can be a fascinating hobby any number of various items can be used to start a collection of any size whether expensive or worthless anybody can do it from a king or queen to a schoolboy just choose your interest.

03649 22178
18470 03952
26581 18560
29473 48951
07365 73649

SAMPLE TEST 7

We all now accept that is important to be fit and sport keeps you active and healthy so spend time exercising in the gymnasium or go out running in the field lift weights and play badminton or just croquet if you are lazy

81360 29015
50647 05749
29638 03628
73814 17495
92847 23615

SAMPLE TEST 8

People keep pets for various reasons some will buy a dog to keep them company because they are lonely and others keep more exotic pets for show or just amusement a quick trip to the zoo may well give you an idea for your own pet.

06471 85072
35816 38469
74059 15690
26813 49385
17492 22073

SAMPLE TEST 9

Driving a car is not the pleasurable experience it used to be many tankers and other large vehicles queuing at the maze of motorway junctions does not bring back my childhood memories I have of a day out at the seaside

16385 94718
37290 59320
84610 01846
03279 59275
64582 64731

SAMPLE TEST 10

The pass rate of people who give up the morse is zero never forget amateur radio is a hobby some people like television others just like building extra equipment so live and let live if you cannot understand others ideas

09571 52718
25846 02463
20493 91571
27563 01837
96840 86493

SAMPLE TEST 11

Short wave listeners generally have receivers which cover nought to thirty megahertz often they have japanese equipment and are knowledgeable on an extensive number of subjects as they listen to many different topics.

50193	85927
98427	04126
63805	73984
60472	61403
51826	73951

SAMPLE TEST 12

Music can be a very relaxing interest some people enjoy listening others dancing tastes extend from classics to the zany quite often I wish I could make my own but unfortunately i am no musician.

40795	52847
24938	20681
18306	69173
05172	56491
63947	28305

SAMPLE TEST 13

I enjoy going to the zoo quite often my wife likes the penguins but I much prefer the elephants although they are less exciting i love the various colours of the exotic birds especially one peacock displaying her feathers.

91407	50378
26745	38750
30941	62195
30172	91528
84629	66438

SAMPLE TEST 14

I look forward to when space travel becomes the next normal thing to do i would love to zoom around the planets even if it was quite shocking at first jupiter would probably be my favourite but i would not really like to say why

02815	38257
51640	73629
73284	18594
96754	43610
70629	01839

APPENDIX-F

DEFINITION OF 12 WORDS PER MINUTE

A question often asked by students is, what actually is 12 words per minute. After all, words can be any length from a single letter to many letters. We could of course take the average length of an average passage of text. But what is average? The standard answer seems to be that an average word is normally regarded as being 5 letters in length. Unfortunately this explanation ignores the fact that Morse code has a varying number of dits and dahs for each letter. So lets take a closer look.

We can translate each letter of the Alphabet into a number derived from the number of dits and dahs each one is represented by in the Morse code. We must also consider the spaces between both the individual dits and dahs and the letters. The example below shows how we would calculate the length of the letter "A."

di-dah

di		dah	
.	.	...	...

From the above we allocate 8 bits to the letter A. Now you will have to take my word for the fact that if we were to do this for each letter of the Alphabet, we would arrive at a mean value of 11.23 per letter. If we round this up to to 12 in order to take account of the space between words, we arrive at a figure of 60 (5 x 12).

However, all letters are not used with the same frequency. "E" is used a lot more than "S" and "S" is used a lot more than "X."

To avoid going into lengthy calculations and explanations, again accept my word for the fact that you would end up with a mean figure in the region of 50. The calculation takes longer to do than the time taken to study for the examination!

The word "PARIS" is generally accepted as being a typical word and if sent twelve times within a minute, would equate to 12 words per minute. Strangely enough, the word "MORSE" is also very close to the "standard" length. In fact many people have voiced the opinion that "MORSE" should be used as the standard word for measuring speed.

The above is somewhat pedantic and far too exacting for normal purposes. If you count the number of letters in a typical passage and divide by 5 you will come close enough for our purposes to the true speed.

AMATEUR RADIO MORSE TEST CHANGES

When the Radiocommunications Agency introduced the 5 WPM Novice Morse Test in June 1991, the year which incidentally was the 200th anniversary year of the birth of Samuel Morse, they were of the opinion that the QSO format would be a more sensible preparation for the real operating conditions encountered on the air than the 12 WPM test in existence at that time. The Radiocommunications Agency have now announced that as from the 1st of January 1993 the 12 WPM Morse Test will change to a similar QSO type format. This revision will ensure that both Morse Tests are standardised and tailored to reflect operating procedures in the amateur service. The requirements will be as follows:

The receiving test for 12 WPM will require the candidate to receive a minimum of 120 letters and 7 figures in the form of a typical exchange between radio amateurs. The duration of the test will be approximately 2 minutes 30 seconds. A maximum of six uncorrected errors will be allowed. A manual Morse key will be used to send the test.

In the sending test the candidate will be given a text to send by hand on a straight Morse key consisting of not less than 75 letters and 5 figures, also in the form of a typical exchange between radio amateurs. The duration will be approximately 1 minute 30 seconds. There must be no uncorrected errors in the sending and not more than four corrected errors will be permitted. The test will include commonly used abbreviations, Q-codes, or procedural characters. These will be selected from the list printed later on in this chapter.

In order to accommodate candidates who have already prepared themselves to take the test under the old system, a three month introductory period will be allowed during which time candidates can choose in advance to be tested under the old or new format. As from 1st April 1993 all tests will be conducted using the new QSO format.

From 1st January 1993, candidates for a Morse Test will be required to bring to the test centre two recent passport sized photographs of themselves. The present requirement for the candidate to bring written proof of identity will no longer be required.

THE NOVICE MORSE TEST

The RSGB will provide the Novice Morse Test at all of its existing centres. To apply for the test booking form contact them at HQ for a list of up and coming tests and locations. It is a good idea to write to the RSGB and ask them to send all literature available on the novice test as they will send you a very helpful package with lots of details. The Morse test itself for the novice licence is straight forward enough. The five words a minute necessary speed for a pass is slow enough to equate with just knowing the code. For example if you say the word Morse as (in the normal way that you speak) Dah-dah, dah-dah-dah, di-dah-dit, di-di-dit, dit. then that is about five words per minute. What makes the novice test slightly harder than the old full class A licence test is the fact that it will include Q codes, commonly used abbreviations and/or procedural characters.These extra points to learn can easily be achieved by doing just a little bit of extra work. Remember I guarantee that Morse is easy to learn it just takes time. So spend time learning it and you will have no problems at all. It has been said that learning Morse code is a habit and that the only way to pick up a habit is to do it habitually.

The test itself covers both sending as well as receiving Morse. As with the test for a full licence the receiving test will normally be carried out first in groups of three candidates followed by individual sending tests. For the first time the receiving test will be carried out using computer generated text using a pre-recorded cassette tape which will also have on it voice announcements. This will eliminate human error. Although I have not heard of an examiner making a mistake we are all human.

Candidates will be expected to copy at least 120 letters and 7 figures in the form of a typical exchange between radio amateurs. This part of the test should last about six minutes. Each of the characters will be sent at a speed of 12 words per minute with a longer than usual gap between each character and

word so that the overall receiving speed will be five words per minute. This is because Morse at five words per minute would sound painfully slow and would not in fact sound like Morse at all just a series of T's and E's at the best of times.

Each character incorrectly received by the candidate will count as one error. If a whole group of characters which could include numbers as well as figures is incorrectly written down with more than one error in it then this would count as two errors. The maximum allowed number of errors will be six. Incidently candidates will not be permitted to write down the Morse symbols when they arrive for the test for use later on, so make sure all the information is in your head and that it stays there. If you have done enough practice before the test then it will not be necessary to write it all down anyway.

In the sending part of the test the candidates will be handed a text to send by hand on a straight Morse key and this text will consist of not less than 75 letters and five numbers. This text should not be sent at less than five words per minute and should take about three minutes to complete. Once again the passage will be in the form of a typical contact between two radio amateurs. No uncorrected errors will be allowed in the sending part of the test and no more than four corrected errors will be permitted.

The test could include any of the International Q codes, and commonly used procedural characters and abbreviations that are listed below.

The procedural code CT for commencing traffic will be sent at the very beginning of the receiving test but will not form part of the actual test itself for marking purposes. However, make sure that you learn this so that you impress upon the examiner your knowledge and dedication to the Morse code. For the purpose of timing please note that figures and procedural characters are counted the same as two letters.

Summary of Novice Licence Morse Test at 5 WPM

Sending: 75 letters and 5 figures (Min.) for 3 minutes duration. Four corrected errors permitted.

Receiving: 120 letters and 7 figures (Min.) for 6 minutes duration. Six uncorrected errors permitted.

ABBREVIATIONS

ABT - about, AGN - again, ANT - antenna, BK - signal used to interrupt a transmission in progress, CPI - copy, CPY - copy, CQ - general call to all stations, CUL - see you later, CW - continuous wave (Morse code), DE - from (used to precede the callsign of the calling station), DR - dear, EL - element, ES - and, FB - fine business, FER - for, FM - from, GA - good afternoon, GD - good day, GE - good evening, GM - good morning, HPE - hope, HR - here, HVE - have, HW - how, K - invitation to transmit, MNI - many, MSG - message, NW - now, OC - old chap, OM - old man, OP - operator, PSE - please, PWR - power, R - received or Roger, RPRT - report, RST - readability,signal strength,tone report, RX - receiver, SIG - signal, SRI - sorry, TEMP - temperature, TKS - thanks, TNX - thanks, TU - thank you or to you, TX - transmitter, TXR - transceiver, UR - your, VERT - vertical, VY - very, WID - with, WX - weather, XYL - wife, YL - young lady, 73 - best wishes, 88 - love and kisses.

PROCEDURAL CHARACTERS AND PUNCTUATION (No gaps between letters)

(AR) (di dah di dah dit)	- end of message
(CT) (dah di dah di dah)	- preliminary call
(BT) (dah di di di dah)	- separation signal
(KN) (dah di dah dah di)	- transmit only the station called
(VA) (di di di dah di dah)	- end of transmission
? (di di dah dah di dit)	- question
/ (dah di di dah dit)	- oblique
Erasure (8 dit's)	- to correct an error

Q CODES (International codes that may be used in tests).

QRA QRG QRK QRL QRM QRN QRO QRP QRQ QRS QRT QRV QRX QRZ QSA QSB QSL QSO QSY QTH.

SAMPLE NOVICE TESTS

These sample tests are all a bit longer than the basic 120 characters contained in the actual test itself, but that is not too important during your learning because as you are setting your standards slightly higher than that of the test you will be well prepared on the actual day. You may well find these tests slightly fussier texts than the actual examination itself. First reports are that the Novice test is quite user friendly. However, as nothing is guaranteed you must be prepared for any eventuality. I found that sometimes the more unusual the text was then the simpler I found it to copy in some ways because difficult text rules out any chance of anticipating what was coming next. As mentioned elsewhere in this book anticipation is a dangerous habit.

Each test begins with (CT); this is in brackets because as mentioned above although the test itself starts with the commencement symbol it is not part of the test itself. I have decided to underline the letters that are barred together although in some books the bar is above the letters. I do not think it matters where the bar is so long as the operator knows what they mean. All it does mean is that there is no gap between the two letters other than the usual one between each individual dit or dah.

SAMPLE TEST 1

(CT) G9AED DE 2E0PLK VY TNX RPRT OM = UR RST 579 WID SLT QSB = QTH BRADFORD ES NAME SHEILA = RIG HR HOME MADE XTAL RNG 3 WATTS TO LONG WIRE ANT = WX VY WARM = SO BACK TO U OM AR

SAMPLE TEST 2

(CT) G9LBD DE UB5YML RST 569 ES QTH CHERNOVTSY = NAME VIKTOR = WX HR VY BAD TODAY SNOW ES TEMP 12 C MINUS = PSE OM TED HR COLLECT WAB SQUARES SO PSE UR WAB? = MY QSL SURE VIA BURO =

SAMPLE TEST 3

(CT) 2M0MNX DE W4VHH UR SIG VY WEAK OM RST ONLY 349 IN BAD QRM = QTH TAMPA FLA ES NAME BUD = RIG IS OLD COLLINS ES ANT 6 EL YAGI = SAY OM PSE CFM UR PREFIX ITS A NEW ONE HR AR

SAMPLE TEST 4

(CT) F6LBG DE 2W0PQS = ALL OK GEORGES OM = I MADE MY OWN TX FROM KIT BUT RX IS BY TRIO = PWR IS 5 WATTS IN = WX TODAY IN LONDON IS COOL FER SUMMER ONLY 14 DEG C = HAD CALL FER 3 YEARS =

SAMPLE TEST 5

(CT) TNX MY RPRT OM = UR RST 589 ES QTH NR BRISTOL = PWR 3 WATTS ES ANT IS END FED WIRE 67 FT LONG = SRI ABT LOCAL QRM AT YOUR STN = ONLY HAD LICENCE FOR 2 MONTHS SO PSE UR QSL VIA BURO

SAMPLE TEST 6

(CT) VY HAPPY TO BE UR FIRST QSO JENNY ES WILL SEND QSL DIRECT TO NOVICE QSL MGR = PWR HR 5 WTTS TO 87 FT LW = WX SUNNY TEMP 27 C = BEEN HAM FER 39 YEARS ES HPE U HAVE MNI DX QSOS IN FUTURE

SAMPLE TEST 7

(CT) FB OM UR SIG NW RST 589 HR IN PUERTO RICO = RNG 60 WATTS TO DIPOLE = VY GLAD QSO IDAHO NW NEED ONLY HAWAII FER WAS AWARD SO VY TNX QSO = BCNU GD DX AR W7LPT DE KP4RJ VA

SAMPLE TEST 8

(CT) TNX FOR QSO SARAH ES NW WORKED ALL 7 NOVICE PREFIXES EXCEPT JERSEY = WL QSL VIA BURO = SRI BUT MUST QRT SO WISH U GD DX ES BEST 73 AR 2D0WTY DE 2E0DPW VA

SAMPLE TEST 9

(CT) USING INDOOR DIPOLE ANT HR = NOT ALLOWED TO HVE OUTSIDE AERIAL AT THIS QTH = BUT HVE WKD 24 DXCC WID 5 WATTS INPUT HI = HPE CPI OK SIMON AR 2J0BHH DE 2E0DSR KN

SAMPLE TEST 10

(CT) MOST OK BUT WAS LOCAL QRM SO MISSED RST = RIG HR KENWOOD TS830S RNG QRP 3 WTTS TO GP ANT = WX IS VY RAIN ES WIND SO HPE ANT STAYS UP HI = PSE AGN RST? AR G5KTZ DE 2W0FLV KN

SAMPLE TEST 11

(CT) SM6CDT DE 2I0AZY RST 589 = QTH BELFAST NAME BRIAN = RIG ICOM ES PWR 3 WATTS OUTPUT TO END FED WIRE = MY FIRST QSO WITH SWEDEN ON THIS BAND BENGT SO TNX ES PSE UR QSL

SAMPLE TEST 12

(CT) 2E0FJU/P DE I7KXP OK ADRIAN GLAD U HAVING FB HOLIDAY ES GLAD TO WORK FIRST UK NOVICE STN = HPE U SN GET FULL LICENCE FER ALL 9 BANDS = ANT HR IS 3 EL BEAM UP 45 MTRS

SAMPLE TEST 13

(CT) IT HAS BEEN MY PLEASURE TO HVE THIS QSO OM ES WL SEND QSL VIA BURO = WISHING U ALL BEST 73 AND GD DX = SHALL I CALL AGN TOMORROW SAME TIME ON THIS FREQ 21045 KHZ?

SAMPLE TEST 14

(CT) 2E0CKW DE UA1AWX OK TNX FB RPRT OM = QTH SANKT PETERBURG ES NAME OLEG = RIG IS 65 WATTS WID DIPOLE ANT = STN HR IS SCHOOL RADIO CLUB = PSE QSL VIA BURO = BEST 73 TO U ES URS DR DAVID

A dear acquaintance of mine says the best piece of practice Morse he has come across is "BEST BENT WIRE" Try sending this passage for yourself every now and again in order to keep yourself up to scratch. Even when you have passed and the test is a distant memory this passage will keep you on your toes.

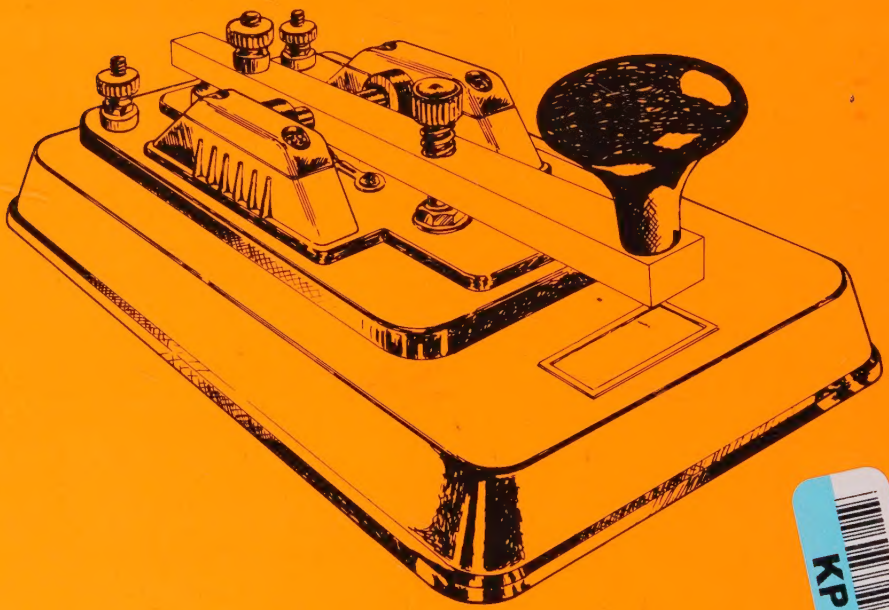
Mark Francis

Hockley September 1992

Many years ago I recall struggling to learn Morse code. If only this book had been available then I would have achieved my goal far quicker and possibly been a better operator.

Long overdue, this book covers the subject in great depth and provides solutions to the many pitfalls that I recall making. Designed to make you proficient in Morse code in the shortest possible time, the publication certainly achieves its objective. The numerous exercises and sample tests all help to make this the most comprehensive book available on the subject today.

Peter Waters G3OJV.



"The most comprehensive book available on the subject today"