Having said all this the CWR-600 has wrinkles. It will not copy CW that chirps — changes frequency during keydown — a characteristic of many UA, UB and UK CW stations. This is perhaps a small defficiency in comparison to the major technical drawback, the generation of appreciable amounts of harmonics from the internal digital circuitry.

It is possible to detect harmonics from the unit all over the place on bands from 7MHz upwards. They sound just like normal heterodynes until you tune them into the passband of the decoder. The PLL locks on, the MPU starts processing, the heterodyne stops, the MPU falsely detects an 'E' and throws it onto the screen, the heterodyne re-starts only to commence the process all over again. The net result is that the machine chucks out neat columns of 'E's, not very helpful when the average amateur CW poses quite enough problems already.

To be fair I was using a wire aerial connected to an ATU adjacent to the morse decoder and receiver. I suspect that a coax or balanced line feeder to a remote aerial would have cured the problem. However I don't have one and trouble was evident. The harmonics were measured at the S3+ level and were present throughout the frequency spectrum.

There are about half a dozen in any 100 kHz section right up to 30 MHz. They are easy to recognise though because they fill the screen with 'E's...

Summarising, this unit is no substitute for years spent getting to grips with grotty amateur morse. If you expect the decoder to lay those bottom kHz wide open, then forget it. However, given half a chance, it does work and is great fun, something that I believe amateur radio should be. It copes with RTTY admirably and on that account alone is worth the price tag of £189. One thing is for sure, it is a lot more useful that all those wretched Latin verbs.

```
__I_IJI_IJ___I_IJI_IJ I1UIJ+K _DDEI_
_ I 1UIJ ]__I__ I1UIJ___ I1UIJI1UI_
I 1UIJ+K I_IJ_ RKEE E HIIΘRL? ΘRL?D
E__HANT T CΘ CΘ CΘ CΘDEY2JIA Y__A YU
IIIII I IE > CΘ _K _ _DE__SA __SA _
_ _ CΘ _DE__IA __IAKΘE.T _ CΘ _ CΘ
_DE__SA __SA _ _ _ _DE __HA Y2JEA Y2
15A + PSE NT __A EN ENΘA OC TU ,UR R
ST 569 569 FB TI EATH IS NR R OST TC
V NR I _S TO6K/ BALTIC SEE E MTASEE
_NANE IS E B E R H A A D B E R S I A
E I I_E G NE EI N EC__A NT _L FG_IIG
3J_B__VTU T_,THEREW^ AOMON_NT_I_IIT_
INGWITH VYSTRONSIGNALES COULNT COPYP
Y6ING SREE, _ATN _= SO_ERPTALLOC G 3
JTGNEEDE_C6A NT ▮
```

A) What appears on the screen for most of the time is gibberish. In actual fact, it is not the fault of the unit. The simple truth is that most hand sent amateur morse bears little relationship to the neat charts shown in all the textbooks.

A typical case is this CQ call received S5 on the 7MHz band. No one thinks about the way they bang out CQ with the result that the message is unintelligible to the machine and only a little more comprehensible by a human. Those dashes are what the unit prints out when it can't make any sense.

```
Q CΘ CΘDE UB5FCL UB5FCL UB5FCL+Θ CΘ
C=DE UB5FCL UB5FCL UB5FCL + K GYWHEU
B5FCL=GDDROM=URRST5NN 599=ΘTHIS ODES
SI E DESSA =NAMEIS OLEG OLEG OLEG =H
U? F6GYWDEUB5FCL KN R6GYWDEU▒FCL=OK
DROMPAUL=T_FORΘSO=MYΘSLSUREVY7▒SDXD
RΘMPAUL+F6GYWDEUB5FCLSKEE ▮
```

B) This is a picture of some fairly respectable CW received at S5 to S6 in the 20 metre band. Once again, it is not totally understandable but this time for a different reason. Rubber stamp QSOs are a useful aid when both parties do not have an otherwise common language. However they look rather strange when you see them in print.

```
AIS ENCORE EXIGZ LE RETRAIT DE
LARMEE ISRAELIENNE DZ LA VILLE... LA
 SECHERESSE DU VERBZ, LE TON
SΘLENNEL UN TANTINET GAULLIEN, LHEUR
E TARDIVE, LE SUSPENSZ DE
L6ATTZNTE.. TOUTHYHETAIT POUR SOU_IG
NER LA GGAVITEHDUHPROPOY,)L6IMPΘGTAN
VZ BZ LA BEVISPON,#SUGGZGZG ΘUZ VZLL
Z-VI ZNANAIT DZ LA.
PZGYΘNMZHYZΘLZHBΘHPGZSIBENTHBE GEPUB
LIΘUE... NITTERRWNDHAHSΘLHWBPLENENTH
ΘTILPYEGHL6EVENEMEMTHPΘΘGHVΘNFORTEGH
SΘNHPNAGEHBZHCHEXHDE
L6ETAT... AHΘBSERVEG LEYHVHΘYEYHDEHP
LΘY PGES,#LEHPGEYPBENTHBEH_A
REPΘB_PΘΘEHNEHVΘΘRAITHD6APLLZUΘS PUS
```

C) The CWR-600 has been adjusted by the manufactures to receive amateur RTTY traffic at 45.5 baud. In this picture, the unit attempts to cope with 50 baud with a resulting heavy error rate.

```
 PA3CCH   DE EA3EXN   THIS TIME DIF
ICU_ COPY ALL NOT..
FOR   VERY ΘRM  ΘRM   SO THANKS FOR
NICE CONTAC DEA MY QSL. CARD
SURE VIA BUREAU I HOPE TO MEET YOU A
GAIN VERY SOON THE BEST 73 AND
GΘΘD LUCK FOR YOU AND FAMILY GOOD DX
. IS     STANDING BY FOR YOUR FINAL
.  GB. GB.  GB. ........  YOU SIG
NAS  IS 45. 43 .  THIS THE PROPAGACI
ΘN   PA3CCH   DE EA3AXN   PSE KKK
KKKKKKKKKKK▮
```

D) When presented with RTTY traffic at the correct speed, the unit decodes it perfectly. Having said that, the tuning of the main receiver needs to be very precise. If the station is more than about 100Hz of frequency ie, the wrong heterodyne tone is presented to the unti for decoding it will not be accepted and the CWR-600 will either do nothing or print out gibberish. Correctly tuned, it is possible to receive RTTY at signal strengths below S3.