inspiration to construct this fine country house and ornate gardens. There are some interesting interior views which are typically Neapolitan. In complete contrast we are taken to one of the remotest corners of Kent, Bayham Abbey on the Sussex border which was started in 1250 but was reduced to a ruin during the reign of King Henry VIII and this was the fate of many abbeys and monastic orders during this period in history.

Autumn has arrived and we are shown scenes of the hop harvest being gathered. Until the early 1960s, it was a tradition every September for thousands of Londoners (mainly from the East End) to go down to Kent in train loads to spend a fortnight or so picking the hops, and here we see whole families of hop pickers (young and old alike) enjoying themselves to the accompaniment of the lively accordion music used at the beginning of the film. As our journey comes to an end, we see the trees and leaves turning red, gold and brown, and we are told that the Weald is just as much a symphony of sights and sounds as it was when we commenced our journey in the Spring.

The narration was superb and well scripted, and Sir John's poetic skills were also put to good use in the sister film "Beauty In Trust". In fact both films were part of the National Benzole "Our National Heritage" series and I can remember seeing these films when I was at primary school. "Journey Into The Weald Of Kent" was first used as a trade test film by the BBC in the late 1950s/early 1960s. [*Your editor remembers it being used in black and white as an afternoon filler programme in the late fifties, almost certainly when the advertised programme was unavailable.*] One afternoon in about 1962 the whole film was accompanied by tape no. 6 (Rachmaninov Piano Concerto No. 1 in F Sharp Minor) instead of the proper sound track. A few years later it was to be featured regularly as a trade test colour film on BBC-2 and here it was to stay until the end sadly came for all the films in August 1973.

First shown as a trade test colour film: Late 50s/early 60s - BBC TV.
Last shown as a trade test colour film: Friday 24.8.73 at 11.33 - BBC2.

It is perhaps worth mentioning that these films commissioned and sponsored by National Benzole were a part of a larger advertising plan to promote the company's image. They backed up informative advertisements in the quality press, and some books were also published along the same theme. This caring image was abandoned later for the "Getaway" image of Super National petrol with young people in fast sports cars!

THE PINEAPPLE VIDEO 625 TO 405 STANDARDS CONVERTER

A review by Jeffrey Borin

FIRST THOUGHTS

I was struck by the simplicity and compactness of the converter. The PCB is only 7" by 5" and is not tightly packed. The whole converter including power supply was in a plastic box 10" by 8" by 2.5". The unit sent for review was a prototype.

The converter is very simple to use. The only connections are mains, 625 video in and 405 video out. The user controls are two switches, one to freeze the picture and a thumb-wheel to select interpolation modes. You will need a modulator to run TV receivers. This should not be a problem as designs have been published by David

Looser and myself. Pineapple may produce a version with integral modulator.

The construction quality, even on the prototype unit, is excellent. The main PCB is double sided with plated holes. The components are a mixture of conventional and surface mount. Production units should have silk screened component legends too. The mains power supply is on a separate PCB and presents no immediate safety hazard though careless poking around could touch a live connection. A comprehensive manual including circuit diagrams is promised.

The whole converter runs quite cool and so it should be reliable.

INTERPOLATION

Uniquely amongst 405 line converters this design stores a whole frame of video rather than just a few lines. This allows some interesting possibilities for interpolation as well as causing a couple of potential problems. In a normal TV picture, due to the nature of interlace, successive lines in the video signal are not adjacent on the screen. The gap between each pair of lines from the odd field is occupied by a line from the even field and vice versa.

The Pineapple converter offers a choice of several interpolation modes. One group interpolates lines that are adjacent on the screen. These come from different fields. This is excellent for a stationary picture but causes problems with movement. These adjacent lines are 20mS apart in time. This means that moving objects will be in different positions on the two lines. The visible effect is that moving objects appear with jagged edges. In extreme cases you can see two separate objects. These interpolation modes are not usable except with strictly stationary pictures such as test patterns. Under these conditions they should give optimum vertical resolution though the subjective improvement is small and they made a very flickery job of my crosshatch pattern.

The other group of interpolation modes uses successive pairs of lines from the same field. These are entirely satisfactory for all pictures.

Two other minor points arise from the frame store design. The output is completely asynchronous to the input. As a result an occasional frame may be repeated or dropped. This should only happen occasionally and should not be disturbing. The picture can be delayed by up to 40mS. This is on the verge of visible lip-sync errors.

RADIO INTERFERENCE

The converter contains much high-speed digital circuitry which is a potent source of RF interference. If you buy the PCB alone you must house it in a metal box. The plastic cased prototype caused severe interference to VHF radio reception and may interfere with other services such as aircraft and police communications. Pineapple will be using metal cases on production units.

There are also a number of minor engineering compromises in the design which might annoy the BBC but are of no importance to the ordinary user.

PICTURE QUALITY

The subjective picture quality is very good. There is slight overshoot after transitions but this is inevitable when a notch filter is used to get rid of unwanted colour subcarrier from the 625 input. I compared the Pineapple converter with a BBC CO6/509 using a professional video monitor and several receivers both pre- and post-war. The BBC converter uses four line interpolation and is engineered to full broadcast standards. The only readily noticeable difference was that the gain of the Pineapple converter was slightly low. There was also very slight ragging of verticals. I am assured that these problems will be corrected on production units. The unit copes well with VHS replay. The output will always have good continuous 405 syncs even if the input picture is poor or non-existent.

CONCLUSIONS
This unit offers very good performance at an affordable price. Recommended.

Pineapple Video is at 39 Brownlea Gardens, Ilford, Essex, IG3 9NL (phone 081-599 1476).

A 625 TO 405 STANDARDS CONVERTER

A design by David Looser with additional material by Jeffrey Borin

Enthusiasts have long suffered the problem of inadequate sources of 405 signals. Everyone wants a standards converter but there are too few to go round. Here is a possible solution. First let's take quick look at the history.

THE BROADCAST CONVERTERS
The first converters were optical. In other words a camera was pointed at a monitor. The BBC designed the original electronic analogue converter, CO6/501, in 1960s. It occupied two rack cabinets each over six feet tall. It was also built under licence by Pye for the ITA. The CO6/501A was an improved version. When it appeared that the 405 line service would outlast the analogue converters the BBC designed the CO6/509. This digital converter was an excellent design using four line interpolation. A small number of all of these converters are in the hands of individuals and museums. The analogue converters are now very difficult to maintain to a high standard.

AMATEUR BUILT CONVERTERS
Until recently the design of a converter for amateur use would have been a very daunting, complex and expensive task. It is still not simple but several intrepid people have succeeded.

The first was David Boynes. His machine has been through several generations and has been demonstrated giving good results. The design is complex and would not be easy to reproduce. Other people have also designed units. To the best of our knowledge the designs by Pineapple Video, David Grant and David Looser have been demonstrated as working. Pineapple Video and David Grant will be offering converters for sale. Others have also been working on designs that have not yet seen the light of day.

We believe that this article describes the first converter that is capable of being reproduced by an enthusiastic constructor. It is placed in the public domain in the hope that it will encourage construction and experiment.

ELEMENTARY CONVERSION
We may do a full tutorial on conversion theory one day but here is a very simple introduction. A standards converter must perform two tasks. One is to dispose of the 220 unwanted lines. The other is to lengthen each wanted line from 64uS to 99uS. Lengthening the lines needs temporary storage so that the video can be written in at one speed and read at another. Nowadays this is best done digitally since the necessary memories, ADCs and DACs are cheap. The decision to drop a line is made when two 625 line syncs occur without a 405 line sync between them. The signal path is actually very simple, little more than a FIFO (first-in first-out) memory between the

ADC and DAC. Most of the complexity is in the supporting logic which has to produce all sorts of carefully timed pulses.

The simple line dropping process will leave visible steps on diagonals and curves. What we ought to do is generate 405 completely new lines from the 625 input. This is done by interpolation. At its simplest imagine generating a new line half way between two existing ones. Take the video signals from the two lines and average them to make the new line. For new lines in other positions use a weighted average. For even better results use a carefully weighted average of more lines. The BBC CO6/501 used two lines. The CO6/509 and David Looser's design both use a four line interpolator. The Pineapple Video unit uses a simplified two line interpolator.

THE DESIGN

Space does not allow publication of the full design in 405 Alive. It uses 36 chips for a basic converter and a further 43 in the optional interpolator. They are mostly low cost standard logic. Full circuit diagrams, parts lists etc are available from 405 Alive at £1.50. If you have Orcad (3.20 or later) we can also supply the circuits on disk complete with component libraries for £1. Please specify 3.5" or 5.25" disk.

CONSTRUCTION SUGGESTIONS

Choose the right size and kind of board. The original was built on a number of single Eurocards (160mm by 100mm) in a Vero 19" rack. This is effective but expensive. The boards and connectors can cost more than the components! An extended double Eurocard (233mm by 220mm) will easily hold the entire circuit without the interpolator. The interpolator just fails to squeeze in with the basic converter on this card. We strongly recommend a board with a ground plane. The double sided microboards (Verospeed 10D2858C) are over £30 but well worth it.

Verowire, using fine self-fluxing wire with a special dispenser pen is very satisfactory but tricky to modify. Wire wrapping is excellent if you have the relevant tools and skills. The original unit was built with a mixture of Verowire and direct hand wiring. Verowire is well suited to the digital areas. Direct wiring is good for the analogue sections where there are more components and fewer connections.

POWER SUPPLIES

The original design requires +5V at 500mA and +12V at 200mA. Future developments could raise this and a negative supply may be needed. The prototype used a Vero PK55 power supply which fitted the Eurocard rack. This is extravagant but effective. The next unit will probably use standard low-cost regulators.

WARNINGS

This is still a complex project, especially if the interpolator is included. No PCBs have been designed and we do not intend to design them. The circuits are believed to be correct and the design employs good practice and tolerancing throughout. We will provide good quality documentation but we cannot quite guarantee that no mistakes have been made in documenting the prototype unit. We cannot promise more than very limited assistance to constructors.

TEST EQUIPMENT

It is unlikely that your assembly will be perfect first time. For faultfinding the converter you will need a good 'scope. Preferably at least 50MHz bandwidth for the digital circuits though you might get away with 20MHz. Alignment is very easy. We assume that you have a source of 625 line video such a VHS recorder or one of the Rediffusion tuner units. Video test patterns are useful but not essential. A 405 line monitor is very useful, otherwise a known good 405 receiver and modulator. No other test gear is needed.

FURTHER DEVELOPMENTS

The original design is excellent but rather complex. We have been working on methods of simplifying the design using programmable logic devices (PLDs). A first (theoretical) attempt suggests a non-interpolating converter can be built with ten chips. The interpolator should use about another ten. There are two penalties. The first is cost. The PLDs may cost more than the devices they replace though this should be more than offset by savings in boards, sockets etc. One of the projected devices for the interpolator is very expensive but replaces over 20 chips. The other is that PLDs require programming. We will be able to supply the JEDEC files but few constructors will have programming hardware. It may be possible to supply pre-programmed devices via 405 Alive. We intend to build a further unit using these principles which we hope to publish later.

Other possible developments include built-in test patterns and self test facilities. This could include a full test card stored in EPROM.

APPEAL

Has anyone got a digitised version of Test Card C? Or can anyone digitise it on a high quality scanner? It would be a tremendous help towards a test card generator option on the converter.

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Christmas VRC meeting at Cricklade

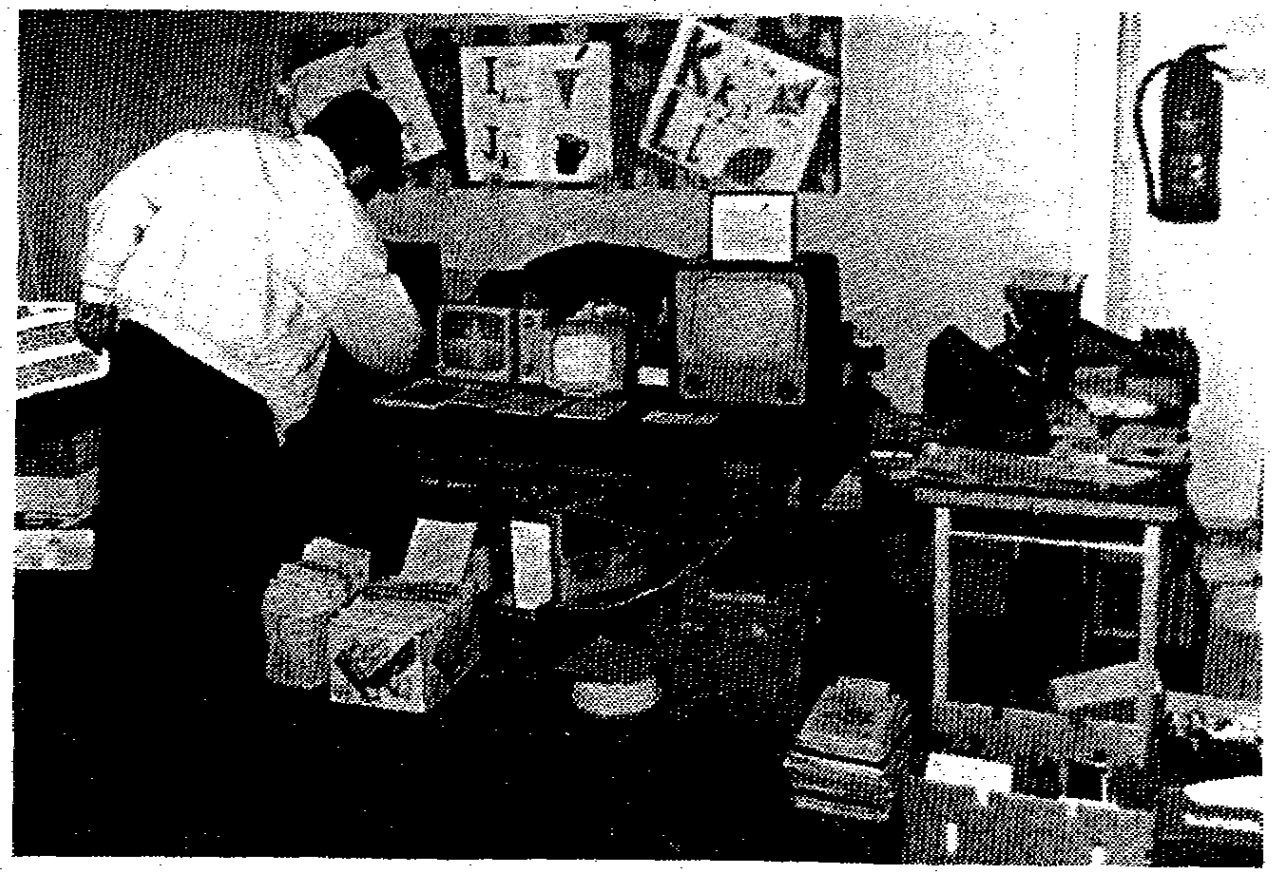

Photo: Dave Higginson