

Bloodhound News

Issue 3 – October 2013



Comment

Welcome to Issue 3. It has been ten months since Issue 2 was published but that unfortunately is down to my available time. The past year has been a very busy time for myself and the BMPG.

Since the last newsletter there have been some significant developments for the BMPG including the acquisition of a radar Type 86, attending the Cosford Air Day and an Open Day for members.

If you have seen the first two issues of Bloodhound News you will notice that the design and layout of this issue has changed slightly. The changes reflect the use of the BMPG logo and placing all the restoration news in its own section of the newsletter.

Preservation of the LCP, and now the T86, continues a pace. Our original goal for the LCP has not changed and that is to reinstate the Bloodhound simulator. A task that involves returning the LCP's Argus 700 computer and display console to working order. Excellent progress is being made and I am confident we will succeed.

A very important development for the BMPG is that we now have a legal entity of a 'Not for Profit Company Limited by Guarantee'. The reason for taking this route is to safeguard the assets of the BMPG, namely the LCP and T86.

What next? Publicity and fund raising has to be a priority for the BMPG. It is very easy to get immersed in the restoration work and push this very important task into the background. Volunteers are required to help run the publicity and fund raising. Can you help?

Pete Harry



Bloodhound MKII Missile in original white Swiss BL-64 Museum

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BMPG Acquire Radar Type 86

The BMPG have acquired a Bloodhound MKII Type 86 (T86) radar from the RAF Museum at Cosford. The T86 was surplus to the museum's collection and was being disposed of in accordance the RAF Museum's disposals policy. The

policy is based on a priority system where accredited museum's get first refusal. If no accredited museum is interested then the RAF Museum can dispose of an item, in this case the T86, to an organisation that will preserve it and provide for its public display. As no accredited museum placed a bid for the T86 ownership of the radar passed to the BMPG.

The BMPG's T86 is Serial No. 501, an ex Swedish Bloodhound PE-44/R radar converted to RAF T86 standard. The radar was last operational in the RAF with 85 Sqn, C Flt, Yellow section at RAF Bawdsey. If anyone has further information on this radar in service with the RAF, please email contact@bmpg.org.uk.



BMPG's Radar Type 86 before recovery

The above photo shows the condition of the T86 before recovery. Note: The two covers on the rear of the Aerial Assembly have now been replaced. The missing on-launch reference aerials, on the corners of the cabin, have also been replaced.

BMPG – A Legal Entity

Much thought has been given to what type of legal entity the BMPG should become. Initially the plan was to create a charity but after taking advice a Limited Company by Guarantee was determined to be the right option. Becoming a charity would not have secured one of the main objectives, to protect the BMPG's assets, namely the LCP and T86 radar.

The name of the company is BMPG Ltd which is a 'Not for Profit - Private Company Limited by Guarantee'. The company does not have a share capital, so there are no shareholders or directors. In this form of company the directors are known as the members of the company. The members of BMPG Ltd are Pete Harry, Mike Strange and Neil Cartman.

Companies limited by guarantee are widely used for charitable purposes, community projects, clubs, societies and other similar bodies. A not-for-profit company does not distribute profits but retains them within the company which in the case of the BMPG is to fund restoration work.

As the legal entity of BMPG is now BMPG Ltd, full financial accountability is made through appointed accountants and any purchases, agreements etc. are with BMPG Ltd.

RAF Cosford Air Show

The RAF Cosford Air Show on June 9th, 2013, gave the BMPG its first opportunity put their LCP and T86 on public display. To complete the diorama a MKII missile was kindly loaned to the BMPG for the occasion by the RAF Museum at Cosford.

The team on the day was Richard Vernon, Neil Cartman and Pete Harry who were fully occupied explaining the main components of a Bloodhound section and its role during the Cold War. There was a great deal of interest in Bloodhound from the public, it was also good to have a number of ex Bloodhound guys turn up on the day.



The public did not have open access to the LCP or T86 but 'tours' of the LCP were given to anyone showing interest which included the Station Commander of RAF Cosford.

Preparation for the Air Show meant a busy week for Neil Cartman and Pete Harry, cleaning and giving the LCP and

T86 their first coat of paint for a long time as both the LCP and T86 had literally yellowed with age. Originally painted in Infra-Red Reflective (IRR) NATO green which gradually turns a dirty yellow if not repainted every few years. As it is probably twenty five years since the LCP and T86 were last painted they were both almost desert sand in colour. A coat of paint also made the LCP and T86 look a bit more loved. The repaint is only a temporary measure before a full external restoration is carried out.

BMPG Open Day

The BMPG's LCP and T86 are currently located in a hangar on the RAF Cosford airfield where access is controlled by the RAF. The Open Day on July 27th, 2013, was organised to provide access to the LCP and T86 and also to meet those involved in the restoration work.

The Open Day was a successful event with the only formal item being a short talk by Pete Harry on the restoration project to date. The majority of those attending were previously involved with Bloodhound, either in the RAF, Ferranti or BAC. It was an excellent opportunity for the restoration team to also meet some of the key engineers involved in the development and commissioning of the MK2A LCP.

Lots of questions were asked, a lot of them to do with how the BMPG started and 'how did you get an LCP'? As a follow up to the Open Day an article by Pete Harry titled 'I didn't mean to be here' was written. To obtain a copy simply email contact@bmpg.org.uk and request it.



Open Day – 'Official Photograph'

Future Bloodhound Events

50 Years of Bloodhound - Update

There will now be no special event in 2014 by the Swiss BL-64 museum to mark the 50th anniversary of Bloodhound MKII. This is due to a clash with other celebrations taking place by the Swiss Air Force for their 100th anniversary. While no official celebration will be taking place for Bloodhound it is still possible to visit the BL-64 museum in 2014. A group visit can be organised, if there is sufficient interest. Please email if interested in attending. This is an opportunity to visit the last remaining Bloodhound section, in original condition.

25 Sqn 100th Anniversary - Update

Some sad news regarding this event as the 25 Squadron Association was disbanded on September 26th, 2013. Dwindling numbers of members and the general lack of interest in joining the Association from those who served on 25 Squadron in the Bloodhound and Tornado F3 years did not provide the Association with a viable future. This means that the planned event to mark the 100th anniversary of 25 Squadron in September 2015 originally being organised by the Association will not now take place.

BMPG Open Day 2014

A date is to be announced but a second BMPG Open Day will be arranged in the summer of 2014. These Open Days provide access to the LCP, T86 and the restoration team. The purpose of the day is a social event.

Working Saturdays

Help is always required with the restoration work and gratefully received when offered. Work takes place at RAF Cosford on most Saturdays. If you would like to help then please get in touch by emailing contact@bmpg.org.uk. An RAF security pass has to be obtained in advance so please do not turn up on the day as access to the BMPG hangar will not be possible.

Restoration work is taking place on both the LCP and T86 with plenty to do. Dates for working Saturdays are advertised in the BMPG's Yahoo Group and provided if requested, simply email contact@bmpg.org.uk.

BMPG Yahoo Group

If you were involved in Bloodhound and want to be kept informed of progress with BMPG's restoration work and general Bloodhound stuff, then why not join the BMPG's Yahoo Group.? Go to <http://uk.groups.yahoo.com/> and search for 'Bloodhound Missile', click on the link to 'Bloodhound Missile Preservation'.

BMPG Web Site

Plans are in place to improve the BMPG web site (www.bmpg.org.uk). The web site will provide general information on the BMPG, what its aims are and what is being achieved with the restoration work. The web site will not be a substitute for the newsletter or for information and postings in the Yahoo Group.

IWM Duxford's LCP

With the kind permission of the Collections Manager at the Imperial War Museum Duxford, Pete Harry was able to visit their LCP. Visitors to Duxford will probably have noticed the tarpaulin covered LCP, located adjacent to their MKII missile.



IWM Duxford's MK2A LCP

The main purpose of the visit was to photograph and document the E.C.'s keyboard in the LCP as it is the only UK variant of the keyboard that remains. The BMPG's LCP has a Swiss E.C.'s keyboard as the original keyboard was missing when the LCP was acquired.

The Duxford LCP is Serial No. 1008 which is known to have been on 85 Squadron, A Flt, Black Section at West Raynham in 1989.

The LCP is complete with no missing

items or units, unlike the BMPG LCP which had the E.C.'s keyboard and top switch panel missing from the console. Internally the LCP is in good condition but not surprisingly it needs a good clean.

The IWM at Duxford have the last remaining set of Bloodhound MKII equipment, as donated by the RAF. Funding for preservation and restoration is limited but the Collections Manager at Duxford will do everything possible to preserve their Bloodhound exhibits, as evident by the protection of some items with tarpaulins.

Visit Report - Swiss BL-64 Museum, June 2013

On June 12th, 13th and 14th Pete Harry, Mike Strange and Richard Vernon visited the Swiss BL-64 Museum. The main purpose of the visit was to obtain copies of missing LCP APs and other documents to support the restoration work in the UK.



The Swiss Team

Mike Strange, Pete Harry,

Gustav Aufdenblatten and Richard Vernon

Gustav Aufdenblatten was our host for the three days. Gustav is the simulator and Argus expert at the museum who gave us as much of his expertise and knowledge that we could cram in to the three days. Time was also spent with Gustav going through though the operation of the simulator from switch-on to running an exercise engagement.

Items from the BMPG's LCP computer rack were also taken to Switzerland for testing in their working simulator; these were the Winchester disk from the Argus 700, two sets of CHARGE display cards and the FT81 terminal.

Over the three days a tremendous

amount of work was carried out both on site and at the hotel in the evening. No time for sightseeing!

Throughout this newsletter the Swiss BL-64 museum has been acknowledged for the donation of items so that restoration of Bloodhound equipment in the UK can be carried out. We have been fortunate to receive such donations but the BL-64 museum is not a limitless supply of Bloodhound parts. Donated items were surplus or being scraped by the BL-64 museum.

Bloodhound MKI Radar T83

The T83, with its control cabin, is still at the RAF Museum Cosford and a permanent home is still required for this unique radar. The RAF Museum would like to hear from any accredited museum, or any other organisation that would be interested in acquiring this radar for restoration and public display.

Bristol Aero Collection Trust

The Bristol Aero Collection Trust (BACT) is responsible for developing the new Bristol Aerospace Centre as a heritage museum at Filton. The centre piece is a new display building for the Concorde currently at Filton. Two listed World War I hangars are also being restored as heritage exhibition halls, visit www.bristolaero.com/centre.htm

The Bristol Aircraft Company was the prime contractor for Bloodhound which was both a technical and financial success for the company. Bloodhound has an important part to play in the Bristol Aerospace Centre and the BACT already have Bloodhound MKI and MKII missiles with launchers. The BMPG's plan is to eventually move their LCP and T86 to Filton so that a complete Bloodhound exhibit can be displayed. The BMPG have already been working with the BACT in support of their work on their Bloodhound MKII missile and launcher, mainly on sourcing missing items. Current restoration work being carried out by the BACT follows:

MKII Missile

Recent work on the missile has involved refitting the fuze aerials to the fore body, the aerials being kindly donated by the Swiss BL-64 museum. It is

believed that this missile is the only one in the UK to have fuze aerials fitted.



Fuze Aerial on BACT's MKII Missile

MKII Type 202 Launcher

The BACT purchased their MKII missile and launcher from MOD at the end of Bloodhound in the UK. The launcher had been stripped of all its assemblies (as had their MKII missile), power pack, hydraulics etc. The launcher looked the part but all the attached assembly boxes were empty. A year ago a full set of launcher assemblies were donated by the Swiss BL-64 museum, the assemblies were surplus and destined for scrap. Over the past year Brian Blestowe of the Bristol Aero Collection Trust has been re installing the missing assemblies to the launcher with the objective of restoring the main electrical circuits and the hydraulic system.



BACT - MKII Type 202 Launcher

In the above photo; note the illuminated bulbs in the 'Fault Locating Indicator Assembly', power on!



MKII Launcher - Hydraulic Pumping Unit

The Hydraulic Pump Unit has been removed from the launcher for refurbishment work to be undertaken on the main structure and hydraulic lines within the launcher. The Low Pressure Pump has been operated temporarily and consideration is now being given to renewing the hydraulic fluid before progressing further.

LCP MKII EC Console

Help is currently being sought by the Bristol Aero Collection Trust to restore their original MKII E.C. console. An initial survey is required to determine if anything demonstrable can be returned to the console, even if it is just indicator lamps. If anyone is able to help, please email contact@bmpg.org.uk.

The following photograph is of the early version of the MKII console at the BL-64 museum.



MKII – Original E.C. Console

MKII Missile – Part 3 & 4

Following on from Part 1 and 2 in Issue 2, two further photos now complete the series that show a sectioned MKII missile.

Further identification of the missile's components and their function would be welcome. Please email contact@bmpg.org.uk.



MKII Missile Warhead and Fuze



MKII Missile Electronics and Guidance Pack

Mystery Photo

The mystery photo in Issue 2 is an army S-band search radar, the AA, No4 Mk7. Information received on the Mk7:

Richard Vernon: *It's an ex-army AA4 Mk 7 Tactical Control Radar, originally used for control of AA Guns and Thunderbird Mk 1 SAM batteries. The Mk 7's were issued to Bloodhound Mk2 flights in the mid 1980's to give each flight its own standalone tactical control facility if the main air defence centers controlling the force were cut off or taken out by enemy attack, thus negating the requirement for the TIR's to do their own searching for targets. The radar in the picture is in a yard at Muckleburgh, along with a Type 88 and 89.*

Joe Marsden: *When I was at Neatishead I operated these radars on the beach at Weybourne, They were used for close control of aircraft for point defence on the coast.*

Now for this issue's mystery photo: Can you identify which main assembly this part of a control panel belongs to?



Answers to contact@bmpg.org.uk. Answer in the next newsletter.

LCP and T86 Restoration - Update

Restoration Comment

The objective of the restoration task is to return parts of the LCP and T86 to a working condition to improve their presentation and demonstrate the technology used. Returning the LCP simulator to a serviceable condition will allow for the demonstration of how Bloodhound was used to detect, engage and destroy targets should the Cold War have become a hot war. There will though be limits to what functions can be restored, for example the T86 will not transmit again, (that question has been asked).

The restoration task is not about 'making new', it is about preserving the LCP and T86 as they were when operational with the RAF. What this means is that the visual appearance of the LCP and T86 will be restored to how they were during operational service. Internally the LCP and T86 will remain in the same condition, i.e. retaining all the hazard warnings stuck on the cabin interior walls. Restoration of such things as corroded chrome draw handles etc. will be undertaken though.

All original equipment in the LCP and T86 will be repaired and restored as required and reinstated. Where some changes are made, for example, the mains supply wiring has had to be modified in the LCP and T86 to run off a single phase rather than three phases, existing wiring is retained so it can always be returned to its original condition.

I expect most readers will not be familiar with the MK2A LCP being restored. The MK2A LCP is the update standard carried out from 1986 onwards, by Ferranti, which replaced the original build MKII LCP's. The MK2A's were in operational service from 1986 until the last RAF Bloodhound squadron was disbanded in 1991. For reference; a diagram of the MK2A Argus 700 computer system is attached to this newsletter.

Pete Harry

LCP Restoration

Restoration continues apace, based on working days at RAF Cosford and a spare room in Pete Harry's house; used for the Argus 700 test rig and also as a workshop.

LCP restoration at RAF Cosford remains focused on the computer racks and display console to reinstate the simulator. Currently, a staged application of mains power to the computer racks and display console is under way.



Display Console 'Lamps On'
Richard Vernon and Neil Cartman

The current task is to ensure as much of the computer racks, of which there are two, and the display console is working before the Argus 700 is reinstalled.



Power Supplies for the Digital Input and Output Chassis Reinstated

Specific details of the restoration task follow under relevant headings:

Switching On the LCP

Was not that straight forward! A standard 13 Amp, single phase, mains is available to the LCP, not a three phase supply the LCP was designed to work with. To switch on the LCP the first goal was to power on the lights and power sockets. After that it was getting power to the computer racks and display console in a controlled way. A task that was easier said than done as the relays and switches to switch on the LCP use two of the original three phase supply. After a couple of false starts it was agreed that the mains input would be connected to the LCP's Neutral and Earth bus bars in Z rack (power distribution rack) and a new bus bar for the single phase live would be installed. This approach had many advantages; the existing neutral and earth busbars remain as is but all circuits that need to be switched on are simply connected to the new busbar.

The current position with powering on the LCP is:

- Lights and the floor 13 Amp sockets work
- The LCP can be switched on from the LCP On button, on the display console
- Power is available to the circuit breakers on the computer rack

No other circuits in the LCP are connected to the mains supply. Switching on the LCP is now as per its operational use but only the computer racks and display console have power, not the rest of the LCP!

LCP Documentation

The BMPG have a full set of LCP APs which provide all the information required to trace faults in the computer racks, display console and power distribution. Also acquired are copies of the logic diagrams for all printed circuit boards, keyboards etc. used in the computer racks and display console. Fault finding is possible down to component level. The BMPG are grateful for the support of the RAF

Museum, who have loaned a number of APs, and also to the Swiss BL-64 museum for copies of additional APs, to make a complete set, and also copies of original Ferranti logic diagrams. Without this support the restoration task will be very difficult, if not impossible.

A Hidden Power Supply

In Issue 2 reference was made to fourteen Farnell power supplies, all now repaired. A correction is now made to that statement as there are actually fifteen Farnell power supplies. There is a PSU15 that provides the fixed -24 Volts DC to the Display Console. It was known that -24V was required to switch on the LCP but the restoration team could not work out where it came from; was it previously an external supply from batteries? Searching the APs we found the location of PSU15 was in the bottom of T Rack in the LCP, except no one could find it there. Eventually PSU15 was found at the bottom of L Rack. The reason for this red herring was that the AP being referred to was one of the Swiss APs and the Swiss do have this power supply in T Rack while the UK LCP has it in L Rack! The fixed -24V power supply has been repaired and is now operating correctly – in L Rack.

All Farnell power supplies are repaired as a matter of course which as a minimum is the replacement of RIFA branded filter capacitors.

FT81 Terminal

In Issue 2 the Argus 700's FT81 terminal had the official status of 'nearly repaired'. It can now be reported that the FT81 is serviceable once more, thanks to the efforts of Mike Strange who battled away to get it working. To make the FT81 serviceable a replacement video board was required, a replacement board was kindly donated by the Swiss BL-64 museum. Once repaired the FT81 was connected to the Argus 700 test rig and failed to display anything from the Argus 700! This non-fault was down to not wiring a link in on the 15 pin D Type socket on the RS 422 cable from the Argus 700. After repair the FT81 ran its internal test routines so all was ready to go. Well almost.

Initially all was going well with the FT81 but after a period of use the FT81 became unreliable. One FT81 test allows a key press repeat on the screen and key presses would work initially but then stop. The fault was eventually found to be a CMOS device on the keyboard which was replaced. The FT81, with its keyboard operating correctly, is now connected to the test rig and working correctly.



FT81 Terminal
Connected to the Argus Test Rig

Argus 700 Test Rig

The test rig has now been developed to a point where the Argus 700 computer boots and the four chassis contain the input, output, analogue and CHARGE display cards can be connected to the Argus 700. It was hoped that the test rig would enable a boot of the Argus 700 to be displayed on one of the console display screens, the first step for a power up of the simulator.



Bloodhound MK2A Boot Screen
(Apologies for the glare)

Unfortunately it has been established that the software halts with errors if only a single display channel is connected, two channels is a minimum.

Ideally all four display channels need to be installed.

The benefit of using the home test rig is that all Argus 700 cards can be tested on an 'it works or doesn't' basis and some functionality in the I/O cards can also be tested. It is planned to extend the capabilities of the rig to test individual chassis, perhaps with a means of external I/O and address line switching. Ferranti did develop such test units for the Swiss, but these units and their documentation no longer exist.

So far testing has been carried out on the Digital Input and Output Cards and these have now been re installed in the LCP.



Argus 700 Test Rig

The above photo shows the test rig in action with displays on the FT81 monitor and on a console display monitor, (borrowed from the LCP). The angled text display on the console monitor is giving the firmware version number from the display controller card, this happens when the CHARGE display cards are not being driven by the Argus 700. All four of the console monitors have been tested by connection to the CHARGE chassis in the test rig and all four give the same display, so are assumed serviceable!

The current challenge on the test rig is getting the Argus 700 to communicate with the Analogue chassis which in turn communicates to a single display channel of three CHARGE cards and hopefully produce a display. Investigation has shown that at least two display channels have to be in situ before the Argus 700 software will talk to the CHARGE display system. In the meantime testing CHARGE display cards does give a display on the monitor, but it is not a driven display from the Argus 700.

Console - Top Switch Panel

The top switch panel installed in the BMPG's LCP was recovered from a derelict LCP (Ser. No. 1006).



Section of Recovered Top Switch Panel (Original Condition)

Most of the damage to the top switch panel has been repaired, including the re soldering of broken wires and replacement of the two speakers (comms and aural doppler). The top switch panel has been refitted to the display console in preparation for testing. Several lamp covers still needing to be replaced.

Display Console Lamp Power Supply

One of the first tasks in carrying out a staged power up of the LCP was to reinstate the -24 Volts DC lamp power supply in the display console and press the Test Lamps button. Surprisingly most of the 28V pea bulbs used in the indicating lamps still worked. Unfortunately one set of lamps were 'on' when they should be 'off', namely the No Fault indication for Missile 7. Initial fault finding shows the fault to be within the top switch panel itself rather than any external unit. The top switch Panel will now be removed from the LCP on the next working day. It is a case of then finding the short that is providing the earth path for No Fault on Missile 7.



Missile 7, green 'No Fault' It should not be on!

Farnell Power Supplies

As explained in Issue 2 all Farnell power supplies have had their RIFA filter capacitors change as a matter of course and then bench tested. What has been discovered is that the higher wattage power supplies, 360 watts and above, can fail after a period of time on load. Obviously longer than the soak test! These subsequent Farnell power supply failures have been due to small bead type tantalum capacitors on the power supply's controller board going resistive or short circuit, one or two smoking making it easy to find the fault. There are three bead tantalum capacitors on the controller board and the policy is now to change all three. This is a straight forward repair, as are the filter capacitors. All capacitor failures in the power supplies are due to at least twenty two years of having no power applied. The main smoothing electrolytics could have been expected to be a problem but that isn't the case – yet.

Power Supply Monitor and Interlock (PSMI)

The role of the PSMI is to monitor the DC power supplies in the computer racks and display console. If a power supply fails then the mains input to all DC power supplies, apart from those supply the Argus 700, are switched off by the PSMI.



Power Supply Monitor & Interlock (PSMI)

To achieve a staged power up of the computer racks the PSMI has to have its override switch on. As can be seen in the above photograph only six of the twelve voltages being monitored are present.

All didn't go smoothly with the PSMI. It operates correctly but the Digital Volt Meter gave no readings. The original was replaced with a spare and the

replacements PSMI is shown in the photograph, with a working DVM.

Spares and Repairs

The BMPG do have a number of spares for I/O and Argus 700 cards but not a complete set that will cover all units. Critical units yet to be found spares for including the display cards (CHARGE) and the display monitors. eBay has proved to be a good source of spares, particularly for the Farnell power supplies. A spare for the Boost Blast Amplifier (Harrison X150) was obtained through this channel.

Initially spares were obtained from two sources: The Swiss BL-64 museum and a derelict LCP (1006). The Swiss museum having some surplus items they have kindly donated. The derelict LCP was not complete and what remained had been badly vandalised, it was though possible to recover a number of I/O cards and importantly a number of chassis which has allowed the Argus test rig to be constructed.

The MKII LCP update in 1986 obviously reflects the technology of the time and most electronic items used on the various cards are standard 74 series TTL devices, still available allowing individual cards to be repaired.

The BMPG are always on the lookout for additional spares as there are a few vulnerable areas, namely the display cards, monitors and a few of the analogue I/O cards. Anyone with knowledge of remaining Argus 700, Ferranti CHARGE cards or Mitsubishi C3920 19" monitors, please get in touch on contact@bmpg.org.uk.

Headsets

The LCP now has two original headsets so once the simulator is working any Technical Supervisors or Engagement Controllers who would like to hone their skills can return to 'as it was'.

One headset was in the LCP when acquired. This headset was covered in mildew and has now been cleaned. The second headset has been kindly donated by an individual who found it in his attic. Said individual has no idea how it got there! This headset is in 'as new' condition and the donation is greatly appreciated.

Both headsets are of the later NBC style, not the type that had the big bulbous maroon ear pieces from the earlier years of the MKII LCP.

Please search your loft as all items donated will be returned to their rightful place in the LCP or T86.

Engagement Controller's Keyboard

The EC's keyboard has yet to be re fitted to the display console. The only reason why it is not fitted is that there are plenty of tasks to undertake before that needs to happen.

Following the visit to Duxford's LCP a comparison to the U.K. keyboard has been documented. Obviously the Swiss and U.K. Engagement Controllers liked to do things differently so the key positions and colouring of the keys does vary considerably.

Converting the Swiss E.C. keyboard to the U.K. standard is a planned task.

T86 Restoration

Restoration work progresses on the T86 with the purpose of dealing with the urgent tasks first, being:

Condition of the T86

An initial survey of our T86 showed that while its exterior condition had suffered the ravages of time from being kept in the open, corrosion was not serious. There were also some initial concerns over what damage may have occurred and what items equipment may have been removed from the T86. Such fears were mostly unfounded.

The main corrosion problem was found on the lower section of the roof at the base of the aerial pedestal where it joins the step to the higher roof section. In several parts corrosion had eaten through the steel roof. The T86 cabin is mainly of aluminium alloy, except for the steel roof section around the base of the aerial pedestal. It is assumed that steel was used as welding was required in fitting this roof section around the circular pedestal base. Repair of the corroded sections has yet to be carried out. The level of corrosion is not serious and does not warrant replacement of the roof, or any part of it.



BMPG's T86 Ser. No. 501

T86 – Missing Items

Items currently missing from the T86 are all the klystrons, the FFT unit and the Digital Scan Pattern generator, these items being removed by the RAF before the T86 was disposed of. Also missing were the three on-launch reference aerials and three of the four elephant's feet that go under the corner jacks. It is believed the on-launch reference aerials were removed by metal thieves when the T86 was in storage. The goal is to eventually replace all the missing items, already replaced are one elephant's foot and the three on-launch reference aerials. If anyone knows of where any of the missing items can be obtained please email contact@bmpg.org.uk

The first task on the radar was to clean the exterior to remove the grime and green algae. No small task but help was on hand from a group of trainees from No. 1 Radio School at RAF Cosford.

Second task – gets the lights on. As with the LCP the initial objective was to just get the lights on without applying mains to the rest of the radar. A task that didn't go smoothly until it was realised, or was it not remembered, that the T86 uses black wiring for earth and green for neutral!

T86 Documentation

The BMPG has limited documentation for the T86 with copies of just three APs. The available APs cover the functional diagrams for the radar and power distribution. Additional T86 APs will need to be acquired to carry out the restoration tasks planned.

Aerial Assembly

At some time in the future the T86 aerials will need removing when the radar is moved from RAF Cosford.

Removing the T86 aerial assembly was not a difficult task when the radar was operational. Part of the operating kit was an 'A' frame with winches, specifically designed for aerial removal. Unfortunately the BMPG does not have an 'A' frame; even if it did the first task would be to position the aerials to the correct elevation and bearing positions for removal. Before the aerials can be positioned correctly the aerial brakes have to be released, first problem.

Releasing the T86 aerial brakes requires two separate -24 Volts DC supplies from two power supplies, one in F Rack and one in the console – D Rack. The original power supplies were not serviceable as a visual inspection showed the large electrolytic smoothing capacitors had blown pressure seals and leaking dielectric. To provide the required DC power two commercially available 24 Volt power supplies were connected to the circuit on a temporary basis. Mains voltage was then connected to the 24 Volt power supplies, again on a temporary basis. When the two 24 Volt supplies were switched on, the roof safety switch and the aerial brake switches on the console applied, there were two separate 'clunks' from the aerial assembly as the bearing and elevation brakes were released for the first time in at least twenty two years.



-24 Volts DC on the Aerial

Once the brakes were released the aerials could be moved in bearing but not in elevation! The suspected problem preventing the aerials from moving in elevation was the Elevation

Drive Motor. The motor, being exposed to the elements, was very likely corroded. The only way to establish this was to remove the elevation motor from the aerial assembly.



T86 Elevation Motor after Removal and Cleaning

As soon as the elevation motor was removed and the aerial brakes released the aerials fell on their back, confirming that the elevation motor was seized and causing the lack of manual elevation aerial control.

After cleaning the elevation motor it was possible to move the motor shaft but it is binding and the bearing at the drive end squeaks. The next task is to strip the motor down to examine and check the bearings.

Roof Decking (Walkway)

The wooden roof decking had badly deteriorated due to its many years exposed to the weather. In parts the decking was completely rotten. Replacing the decking is a priority as access to the T86 roof is required for working on the corrosion to the lower roof level and the aerial assembly.



T86 Roof Decking Laid Out after Removal

The cabin roof decking has been removed from the T86, leaving it in position would have posed a hazard.

Two large sections of decking form a sandwich of wooden lengths, the walkway, screwed to plywood which has an RFI rubberised sheet bonded to

it. The plan is to replace the decking without the plywood and the RFI sheet as the plywood is also rotten in places. The RFI sheet will be kept and possibly reinstated at some future date, if it can be removed from the plywood.

Wood has already been sourced to manufacture new roof decking. The decking will also have the walking surface covered with anti-slip material. Progress will be reported in the next newsletter.

T86 Keys

On acquiring the T86 it was found that there were no keys. No door key, no EHT key, no tool draw key etc.

One of the first tasks was to remove the various key locks from the T86 and pay a visit to a local locksmith. As a result new keys have been cut for all the internal locks, but not for the main door handle. The T86 is secured by a padlock using the clasp on the T86 door installed during its operational days.

Roof Safety Switch - Castell Key

The Castell Key for the roof safety switch was missing on BMPG's T86 when it was acquired. The Castell Key is used to lock the roof ladder in the safe position for servicing access to the radar roof.

Fortunately the BMPG had access to a derelict T86 which still had its Castell Key in position on the roof ladder. Neil Cartman took charge of salvaging the key and installing it in the BMPG's roof ladder switch box. Not a straight forward task as the switch mechanism also had to be changed.



Roof Ladder in the 'Workshop'

In the photograph above the 'new' Castell Key is protruding from the top of the roof switch box.

... and Finally

Everything stops for tea!



Pete Murray, Neil Cartman and Pete Harry having a well-earned break

In Issue 2 the question was asked: A notice in the LCP states 'temperature should be checked three times a day'. What temperature is checked and why? Was this to do with the air conditioner on the launcher and depending on the temperature an adjustment was made in the LCP. Perhaps an ex 'L' man can elaborate on this?

In the next issue of the newsletter it is hoped to have reports from various museums on their Bloodhound exhibits and from other Bloodhound restoration projects underway. Notable among these is the Flying Club at North Coates who are restoring MKI missile for display there. In the meantime here is photo of BACT's MKI missile on an original MKI missile trailer.



MKI Missile on Trailer

Contact Information

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Photographs courtesy of: Neil Cartman, Mike Strange and Pete Harry

Attachment to Newsletter Issue 3

BMPG Newsletters refer to the various items in the LCP that go to make up the Argus 700 Computer System and Display Console. The following diagram is provided to show the layout of the Bloodhound MKII Simulator

