

Clansman Harness Interface II Joe Bell G4PMY

Having recently written about how to utilise the functions offered by the Clansman harness equipment, and in particular how to interface none Clansman radio sets into the harness, the very first radio set I wanted to interface needs no adapter box.



The radio set in question is the Marconi Scimitar V. Marconi Space & Defence Systems (MSDS) at Browns Lane, Portsmouth, developed this radio set on a P.V. fund. Private Venture Capital (PV) is when a company advises the MoD there is a “better way” to go, but are unable to persuade same to put the money into the project. So, they use their own money at risk of hoping to sell the product, which results on its excellence and performance. The Scimitar V developed in the mid to late 70s was a highly advanced radio set born from the concept of secure communications. The Scimitar range is not classified in the UK because it was never adopted by the MoD (so the PV failed here), but was purchased by other armies. It is likely that the owner/user would need an end user certificate from GCHQ as this set has powerful encryption systems even by today’s standards.

The radio set as stated was designed by Paul Dent’s team down at Marconi Milcomms at Portsmouth, but the writer can also claim a little credit in the design loop because MSDS Kidsgrove, Staffordshire also undertook some of the development because of shortages of engineers at that time. The radio set was designed to be compatible in basic mode of operation with Clansman, but any similarity ends there. The Scimitar is capable of both digital encrypted communication and Electronic Counter Measures Resistance (ECMR). It was the ECM systems which were modelled at MSDS Kidsgrove. So what’s all the fuss about? Well in secure mode the modulation is all digital 16Kb with encoded bits to describe the users voice quality and audio levels. This digital stream is then subjected to a thirty-two bit rolling code encryption. There are all sorts of software routines built in to cater for prolonged radio silence (keeping the encryption synchronised during these periods) late entry to net and the transmission of time and cryp signatures which in themselves give nothing away but enable the out of sync radio set to re-acquire the net.

I remember great debate about the ECM targets which should be met. The greatest threat on the battlefield at that time was the portable jammer. Circumventing the jammer was a radio set capable of frequency hopping, a process where each radio in the net changes operating frequency many time per second in the hope the jammer could not track or predict which channel would be used next.

The Scimitar employs orthogonal hopping in that it never repeats individual steps in the hopping algorithm, thus the

outcome of the great debate was to make the Scimitar a full bandwidth hopper. The jammer can be fed with a “comb” of frequencies, i.e. jam many channels at once, so the Scimitar used the whole of its coverage capability to hop. By using 30 to 80 MHz, any jammer programmed with so many channels in its comb would have its power density severely reduced, and so not be a jammer any longer.

The photograph shown is of a Scimitar V VHF pack set mounted on its vehicle appliqué unit which is also a 50-watt power amplifier. The two connectors on the front of the appliqué are labelled harness and aux. The aux connector is used to load data into the radio set via the appliqué. The harness connector is just what it says.

But a word of caution. The harness connector may not have the same pin-out as your manual suggests. There are quite a few variations on a theme for the integration of this radio set into the existing equipments of various national armies. So, test first.

The connector has nineteen pins (again there are versions with seven pins), and not all nineteen pin versions are the same.

Here is a list of pins and functionality.

Pin A Remote line audio and signalling bias

Pin B Remote line audio

Pin C Ground

Pin D 2v p-p RX audio plus TX side-tone

Pin E Ground

Pin F 10v p-p audio Hi Z

Pin G Ground

Pin H 10v DC output Current limited

Pin L Modulation input low level

Pin N 24vDC output

Pin R 12v DC output

Pin U Ptt input active high * see note

Pin V Mute state output active low (low when mute open).

Pins A&B.

Pins A&B are intended for extended line control. They carry RX audio which must be ac coupled at the listener end. Placing a restive load which is above 1K Ω will place the radio set in transmit mode, at which point A&B will become the transmitter audio input. Placing a resistance below 1k Ω in value will cause a buzzer to sound on the harness system. This is used by the remote operator to attract the attention of the local operator.

Pin D carries RX audio in receive mode, and also transmit side-tone in TX mode. This pin would be used in conjunction with a ground pin. So, the easiest way to patch the Scimitar V into a clansman harness is to use A&B, plus C&D. In my previous scribbling re clansman, you may recall that the interface box 2 set and or 3 set (IB2 & IB3 boxes) both present a resistive load on the TX audio lines when the PTT is pressed. This is exactly what Scimitar needs. So connect IB2 pin A to Scimitar harness pin A, and IB2 pin B to Scimitar harness pin B.

Next the receive audio line Scimitar harness pin D is connected to IB2 pin D, and Scimitar harness pin C to IB2 pin E, yes E as C in clansman carries +Vcc.

Also connect the screen of the interconnecting cable to ground

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I should also mention that clansman transmissions can carry a sub-audio tone of 150Hz. This is used to trigger rebroadcast facility if it is enabled. Scimitar will reinsert this tone if it is absent on the original transmission where it is used as a squelch control. This also has the effect that if the Scimitar receiver is receiving a signal which carries the tone, then PTT will not activate whilst the signal is incoming. This is to prevent other transmissions killing re-bro facilities. Signals which do not carry the 150Hz tone, may be interrupted at any time, and PTT will always be available.

So, is this a vintage set? Well, I certainly feel vintage.