

Installation of a 'Below-Deck' Autopilot on a C34 MKII



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I hope everyone had a good summer, and those of us in Texas are hoping for a long fall and some good cooler (not cold...) sailing.

I am happy to say that we have a nice article in this edition from Graham Dodd, a UK resident and member of the C34AL. Graham tells me that he recently retired and now has

plenty of time to sail and do lots of projects on his 1997 C34 MKII. Hopefully we will be hearing more from Graham in the future! —**John Nixon**, Orta Vez; Hull #728, c34hull728@gmail.com

I purchased Smooth Jazz (1997 C34 MkII, hull #1376) in August 2004 as I thought it superior to many European yachts in that price range. After 14 years, I still hold this view. However in 2004 it came with an unreliable wheel autopilot and basic electronics. In 2005 I had all navigation electronics replaced with Raymarine equipment. I chose Raymarine because I have used them or their forerunner (Autohelm) since 1992 and enjoyed good service and reliability. The wheel pilot I chose was the ST4000 Mk2 model which was the strongest of Raymarine's wheel pilots; recommended for vessels up to 18,000 lbs. displacement; so should have been fine for Smooth Jazz at 12,550 lbs.

Smooth Jazz is based at Chichester on the South Coast of England and makes an annual voyage across to France and along the North Brittany coast; the voyage being approximately 500 miles. On many of these voyages, I encountered complete or partial failure of the ST4000 autopilot resulting in repair or replacement. In the summer of 2014, I again encountered a failure that required the unit being replaced. It was at this point that I decided to go for an up-grade, which meant a below-deck system.

After taking measurements in the aft lazarette, I found that I had insufficient space for the smallest below-decks Ray-



marine autopilot; this being their Evolution 'short-shaft' linear-drive system which was good for displacements of up to 24,000 lbs. The drive unit needed to be mounted on the strongest part of the stern, that being the underside of the aft boarding platform. The problem was that the aft water tank prevented full movement of a tiller arm (required for a below decks systems) when turning the boat to port. The only solution I came-up with was to have a section of the water tank cut away so that the tiller arm could move freely. The water tank would in any event, need to be taken-out in order to work on the rudderstock and the underside of the boarding platform.

With some trepidation, the project began and the following is my programme of installation:

Equipment Purchased

1x Raymarine Evolution short shaft Autopilot system – product #1701581x Raymarine Rudder Reference Transducer – product #M811051x Raymarine Seatalk1 to Seatalk NG conversion kit – product #221581x Edson Tiller Arm – product #926-10-610MKII, bored to 2.86"4x Catalina polished flush-head drive mounting bolts – product #000531

a) Clear the decks: Removed all bedding and cushions from the aft cabin along with the aft wooden panel that traverses the cabin.



b) Cut the water tank: A 'cutting line' was drawn on the water tank sufficient to provide free movement of an Edson tiller arm. The water tank was then removed and sent to a specialist polypropylene fabricator. The re-fabricated tank was back in two weeks; I believe I have lost less than three gallons in capacity. [Tech Ed note – The small cut-out at the left end of the new larger cut-out as shown in the picture is, I believe, what is left of the original 18" w x 5.5" d x 2.75" h cut-out designed to clear the Edson rudder radial drive-wheel. That may help you have a sense of scale.]

c) Edson tiller arm: Product #926-10-610MKII, bored by Edson to 2.86". This was positioned just below the Edson steering radial drive-wheel. Integral clamp bolts were then tightened so that tiller arm was 90° starboard of the rudder position. Once absolutely sure we had the correct angle, the rudderstock was drilled and the tiller arm clamped and bolted.



d) Raymarine linear drive: The drive (product #M81130) was positioned on the starboard underside of the aft boarding platform so that the drive arm made a 90° angle to the tiller arm. Whilst there are a number of connecting holes on the tiller-arm that can be selected for the drive arm to attach, we wanted to position it towards the outer ones in order to obtain maximum leverage. Once a 90° angle was established, holes were then marked and drilled in the platform and the drive unit bolted with the Catalina Flush-head bolts – product #000531.

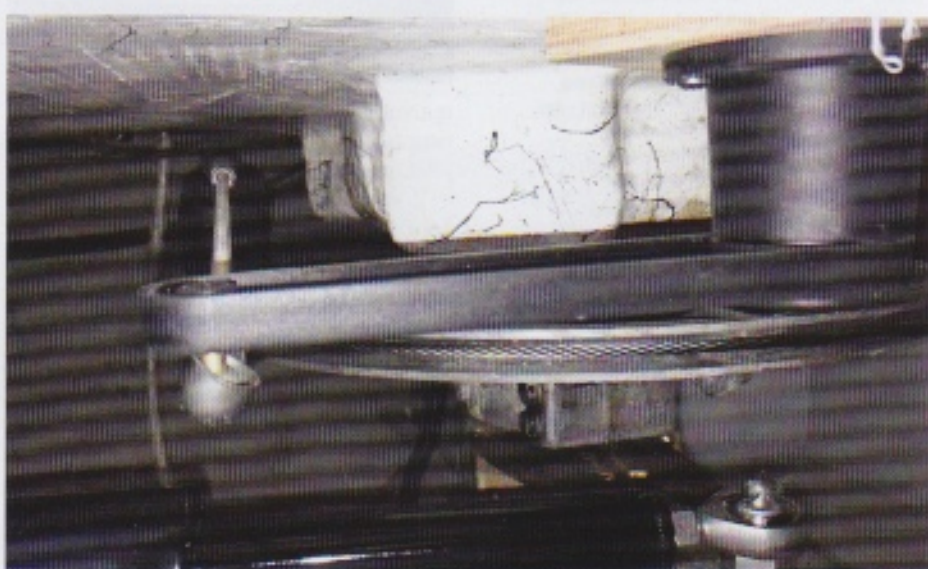
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e) Raymarine Actuator Control Unit: Product #E70099 was installed under the heads sink unit. Taking-out the locker doorframe provides better working access to install the ACU.



f) Raymarine Sensor Core: Product #E70096 was positioned in the starboard locker forward of the Holding Tank as we wanted to keep it clear of any electro-magnetic interference. Looking back, I think we were a bit over-cautious and this could have been installed below the head sink along with the ACU. [Tech Ed note – With any sensor that contains magnetic sensing functions, constant vigilance is required to be aware of what is stored or located anywhere in close proximity to such a sensor that might be magnetic. A bit



of awareness of the surroundings can prevent lots of weird problems in a AP system sensor.]

g) Install the Control Head: Product #E22166 merely was a replacement for the old ST60 control head used on the ST 4000 wheel unit. The STING Adaptor Kit product #E22158 was installed within the instrument pod and is a simple 'plug and play' unit.

h) Rudder Reference Transducer: In addition, we used a Rudder Reference Unit Product #M81105 which while not essential, is recommended by Raymarine. Unfortunately, I did not find anywhere suitable to mount this, so I had to screw and glue a piece of marine ply to the underside of the cockpit deck; not great to look at, but it works and is out of sight below decks.

The Raymarine Evolution System #T70158 includes the drive, ACU, sensor core and control head. The system has a simple to use, dockside set-up procedure and hence it was soon working. Once we were satisfied with its operational status, we inserted and re-strapped the modified water tank along with the aft panel in the stern cabin; lastly a beer or two.

Three seasons later, I am extremely pleased with this Autopilot, as it is silent, reliable and simple to use. In 2016 my son-in-law (who also has a C34 MKII), installed the same system. Shortly afterwards he did a round trip of 3,000 miles from Chichester, UK to The Canary Islands off North Africa and was pleased with its performance.

—Graham Dodd, Smooth Jazz #1376