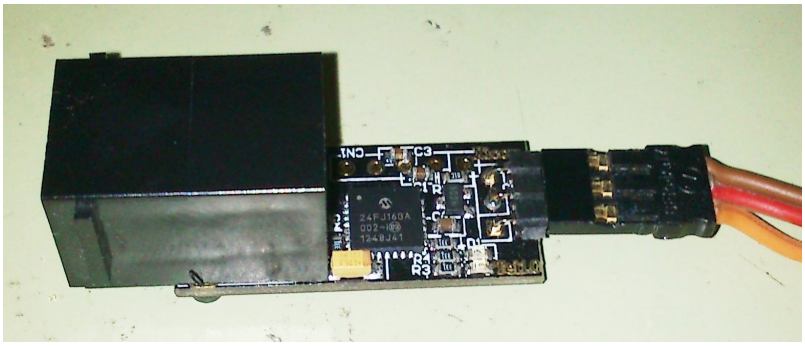
Xicoy Electrónica SL

Serial adapter 1.0

V10 Fadec to serial comunications

Users Guide.



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Xicoy WEEE register number: ES004749

Manual contents & design: Gaspar Espiell. V1.0

Welcome!

Congratulations on the purchase of your new adapter. Xicoy are dedicated to the design and production of electronic controllers to the highest standards of quality and reliability to bring you the customer the very latest next generation designs.

Features:

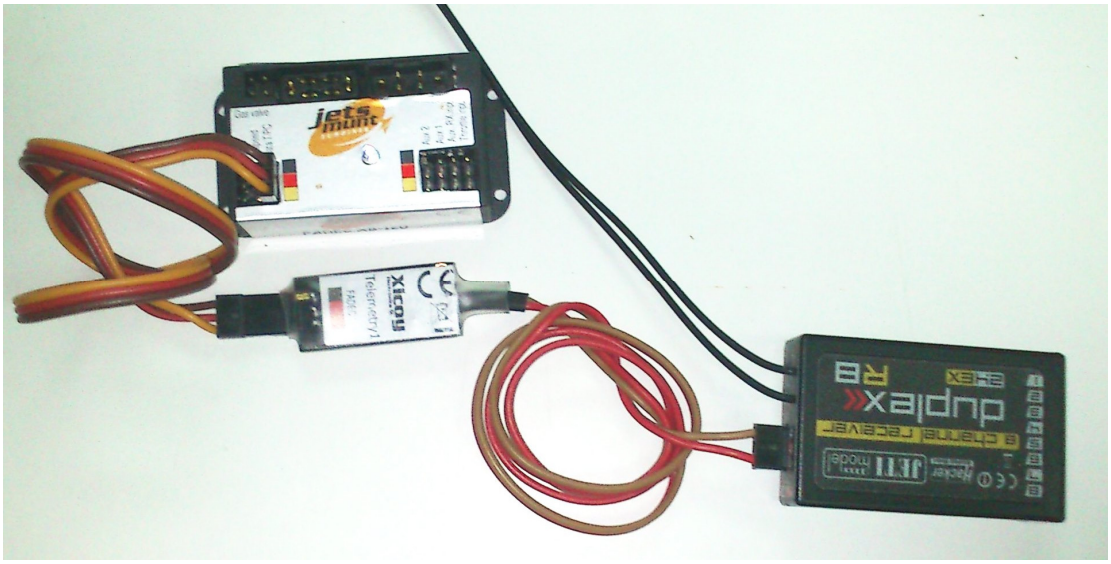
The Xicoy serial adapter provides the protocol translation between the data from the engine collected by the different Xicoy Fadec turbine controllers (from model 107K) and JetsMunt specific controllers which use different proprietary protocols to a standard asynchronous protocol to allow the data to be collected and used in other systems like test bench setups on universities.

Electrical connections:

The adapter connects to the ecu trough the supplied 3 wire patch lead, and it is powered by the ecu.

On the other side of the adapter there is a RJ12 connector of which 3 pins are used, TX, RX and ground. Ground is the same as the ecu and engine ground; take this fact in to account on industrial installations to avoid ground loops. Signal levels are of 3,3V TTL. Under request Xicoy Electronica can supply a 3 wire lead installed in place of the RJ12 connector, or a RS232 compliant lead.

The adapter has 2 small LED lights to show its working status, one green and one red. The green led blinks to confirm that there is traffic from ecu to adapter, and the red led blinks to signal the traffic from the adapter to the external device.



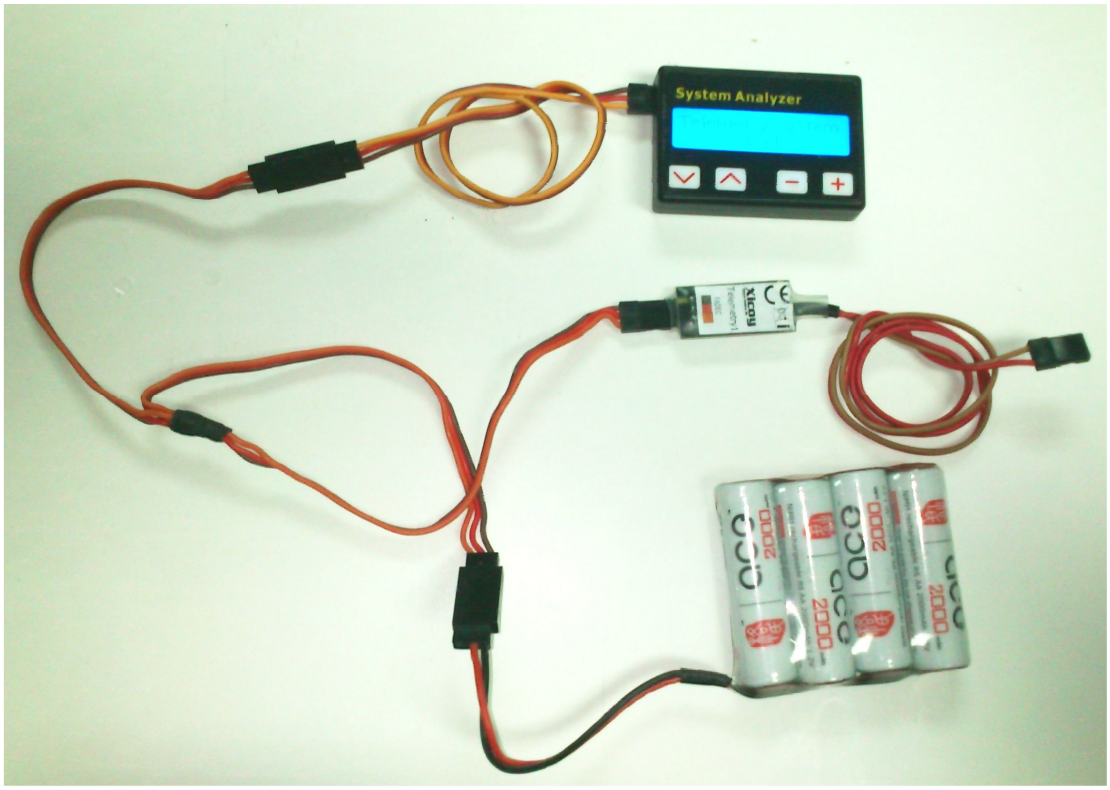
BASIC SETUP:

The list of measures and commands available in the current software release are described in the protocol section.

If the adaptor is going to be used in a flight vehicle and on this application is necessary to have the information of fuel flow and remaining tank capacity, due that several fadec models don't support these measures, the adapter itself can calculate these values from the data retrieved from the fadec, plus a couple of parameters to be programmed on the adapter. This programming is only necessary if you plan to use the fuel flow and tank capacity information.

The programming procedure is:

Connect the data terminal to the fadec port on the telemetry adapter trough a "Y" servo lead. Connect a battery (4 to 8V) on the other port of the lead to power both devices. Connect the battery last, after both devices are already connected.



The RED led on the adapter will lit, and the data terminal will display

Tank capacity: using +/- buttons set the tank capacity on your model in milliliters. (1Oz=29,6ml)

Pump factor: The unit calculates the fuel used from the pump power supplied the fadec. Different pump models move different amounts of fuel at same voltage, so this factor should be set to suit your particular engine+pump+installation.

At moment of writing we don't have a table of values for the different engines on the market. The recommended calibration process is:

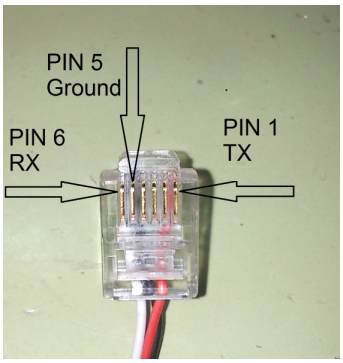
1) Enter the fuel capacity of your plane in the "tank capacity" menu. Leave the pump factor at the default 400 unit, unless you know a more accurate figure for your engine model.
2) Do a normal flight; use your usual timer to determine the length of the flight. Ignore on this flight the % of fuel in the tank displayed by the telemetry on landing.
3) After landing, before to shut down the receiver, check the % of remaining fuel displayed on the telemetry screen.
4) Measure the real quantity of fuel left. If you use a regular shape tank (cylindrical, square, etc) them you can measure the height of the remain fuel in respect to total capacity of the tank.
5) Once you know the % displayed on the radio and the real % of fuel in the tank, you can calculate the correct pump factor in your plane.

Example: You have set a pump factor of 400. After the flight you see that telemetry show a remaining fuel quantity of 18%. Then you measure the tank, and you have a tank of 20cm long of a regular shape and the fuel that remain arrive to 5cm height of the total of 20cm.

*Your remaining fuel is 5/20*100= 25%*
The indicated fuel as per telemetry is 18%
The error is 18/25= 0,72. Then, the new pump factor should be 400 x 0,72= 288

Serial interface protocol and electrical connections:

Electrical:



Pin 1 is the TX pin, pin 6 is the RX pin, and pin 5 is ground. Do not connect anything else on other pins, these pins are connected directly to CPU and can damage it.

Nominal electrical levels are of 3,3V. Rx input is tolerant to 5V inputs. TX output always will output a 3,3V signal.

Serial interface settings:

baud rate: 9600
data bits: 8
parity: none
stop bits: 1

Protocol description:

Data is retrieved from the adapter trough different commands. See table.

Note that the adapter is continuously retrieving the data from the fadec, but due at the nature of the fadec protocols and speed data speed used on different fadec models, there are 3 types of informations available that differ in the refresh rate.

High speed: Updated 10 times/second, like RPM, EGT, Pump power
Medium speed: Updated each 2 seconds.
Slow speed: Updated once each 60 seconds

Command structure:

SYNC , COMMAND, CR

Where:
SYNC: First byte. Always C7h value (Decimal 199)
COMMAND: 3 byte command in ASCII. See table.
CR: Last byte. 0Dh value (Decimal 13)

After sending a command, the adapter will return the answer for this particular command, see the table.

Example:

To retrieve the data displayed on the LCD screen of the fadec. The command is "RSD".
Then the command would be:
C7h 2Ch 52h 53h 44h 2Ch 0Dh

C7h -> Sync
2Ch -> "," Separator
52h -> "R"
53h -> "S"
44h -> "D"
2Ch -> "," Separator
0Dh -> CR, last byte.

The ecu will return two strings.
First, a copy of the command received, followed by the data requested

In the above example, it will return:

The command received: C7h, RSD, 0Dh
C7h->Sync byte
2Ch -> "," Separator
Payload in ASCII "TrimLow EGT 20CRpm 50.000Pw=124"
2Ch -> "," Separator
0Dh -> CR, last byte.

Command	Meaning	Answer (Payload)	Update rate	Adapter version	Fadec models
RSD	Read Screen Data	ASCII text 32 byte	F	All	All
RCV	Read Current Values	RPM, EGT in ºC, Pump Power, Voltage of Battery, Throttle %	F	All	All
WDU	Data Up Command	OK. *-> Send to the fadec a keypress on the "+" button*	-	All	All
WDD	Data Down Command	OK. *-> Send to the fadec a keypress on the "-" button*	-	All	All
WMU	Menu Up Command	OK. *-> Send to the fadec a keypress on the "^" button*	-	All	All
WMD	Menu Down Command	OK. *-> Send to the fadec a keypress on the "." button*	-	All	All
RAV	Read Adapter version	ASCII version number (ex: 1.0)	F	All	All
REL	Read Engine Limits	Full Power RPM, Idle RPM, Max EGT, Pump Limit, Tank Size ml	S	All	All

Disposal

Electrical equipment marked with the cancelled waste bin symbol must not be discarded in the standard household waste; instead it must be taken to a suitable specialist disposal system.

In the countries of the EU (European Union) electrical equipment must not be discarded via the normal domestic refuse system (WEEE - Waste of Electrical and Electronic Equipment,directive 2002/96/EG). You can take unwanted equipment to your nearest local authority waste collection point or recycling centre. There the equipment will be disposed of correctly and at no cost to you.

By returning your unwanted equipment you can make an important contribution to the protection of the environment.