PETSTER Deluxe™

An in depth look into the Axlon Petster Deluxe robot cat from 1985 written by Jonathan Painter 2010.

Axlon part of a group of start up company's called The Catalyst group founded by Noland Bushnell formerly of Atari created many toys/games/robots during the mid 1980's before going out of business as I can work out in 1987. I think the company was then brought out by Hasbro.

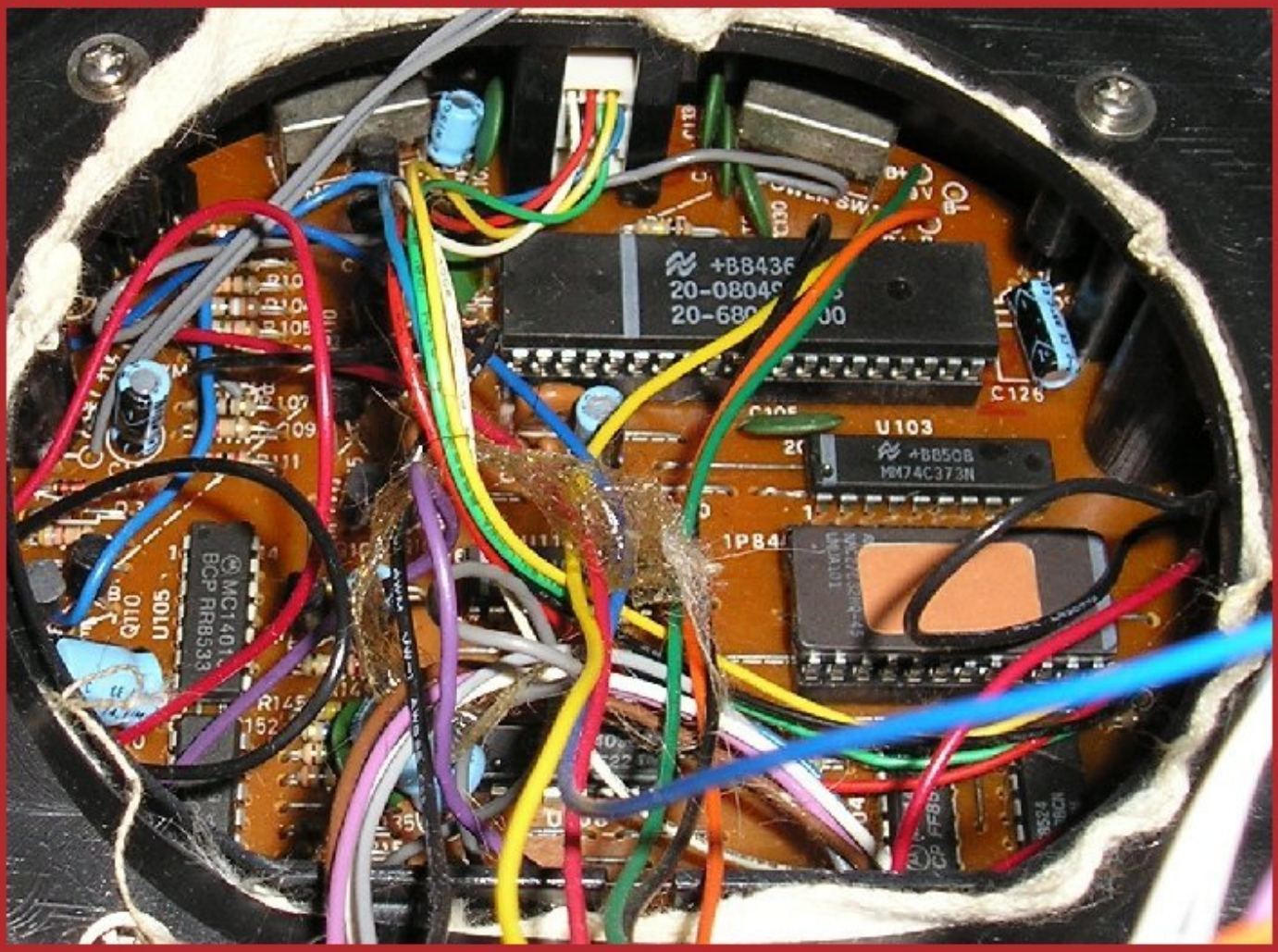
They released a line of robotic pets originally to be called "Micro Pets" (According to a 1984 Antics article.) later named Petsters the 3 original products were Small Cat,Puppy & Deluxe cat unlike the smaller cat the deluxe cat is far better made and doesn't suffer from cracked gears. I have yet to see any problems and I own 5 deluxe cats and use 2 of them frequently. The main drive mechanism is far better being able to drive over nearly all surface types. I am going to focus on the deluxe cat because I feel as a 1980's toy robot it is over looked and possesses many features that even the Omnibot series didn't come with as standard.

The Petster deluxe has the following sensors built in:
2 sound triangulating microphones
1 Infra-red obstacle detector
1 Infra-red Optical encoder (contained in Gearbox)
1 Light dependent resistor (pet sensor)

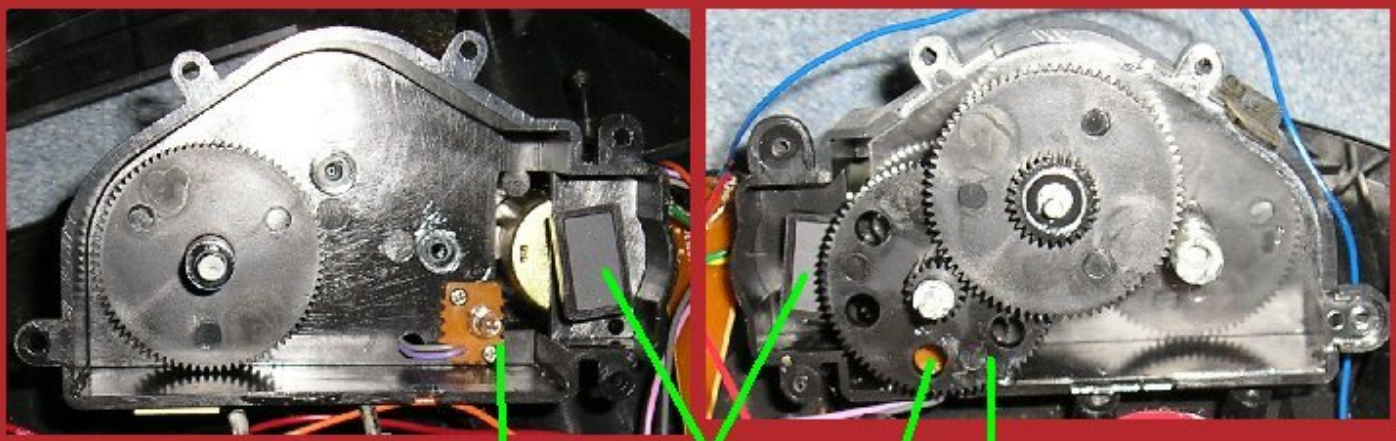
Petster deluxe runs of 6 D cell 1.5v battery's the battery's are split Gnd - 6v & Gnd - 9v the 6v is used to drive the motors while 9v drives the computer and leds. *(see page 3)*

The gearbox used in the Pester is the same one used in Milton Bradley's Bigtrak the mounting points are different as is the position of the optical encoder. The robot uses this encoder in the same way Bigtrack does for counting distance. It is also used as a secondary obstacle detector for detecting motor stall. The gearbox is linked by way of a magnetic clutch arrangement to ensure both left and right wheels stay in sync while travelling forward and backwards. By the look of the PCB the Petster was originaly going to use 2 optical sensors in both sides of the gear box as on the main PCB it has two holes labelled LMTC & RMTC the RMTC goes to the optical encoder while LMTC is joined to it at the PCB, I have tried to add a second optical sensor but it seems that it doesn't work, they must have dropped the code to support it as the magnetic clutch provides near perfect strait movement anyway.

PETSTER DELUXE MAIN PCB 1985 MODEL



BOTH HALF'S OF THE GEAR BOX

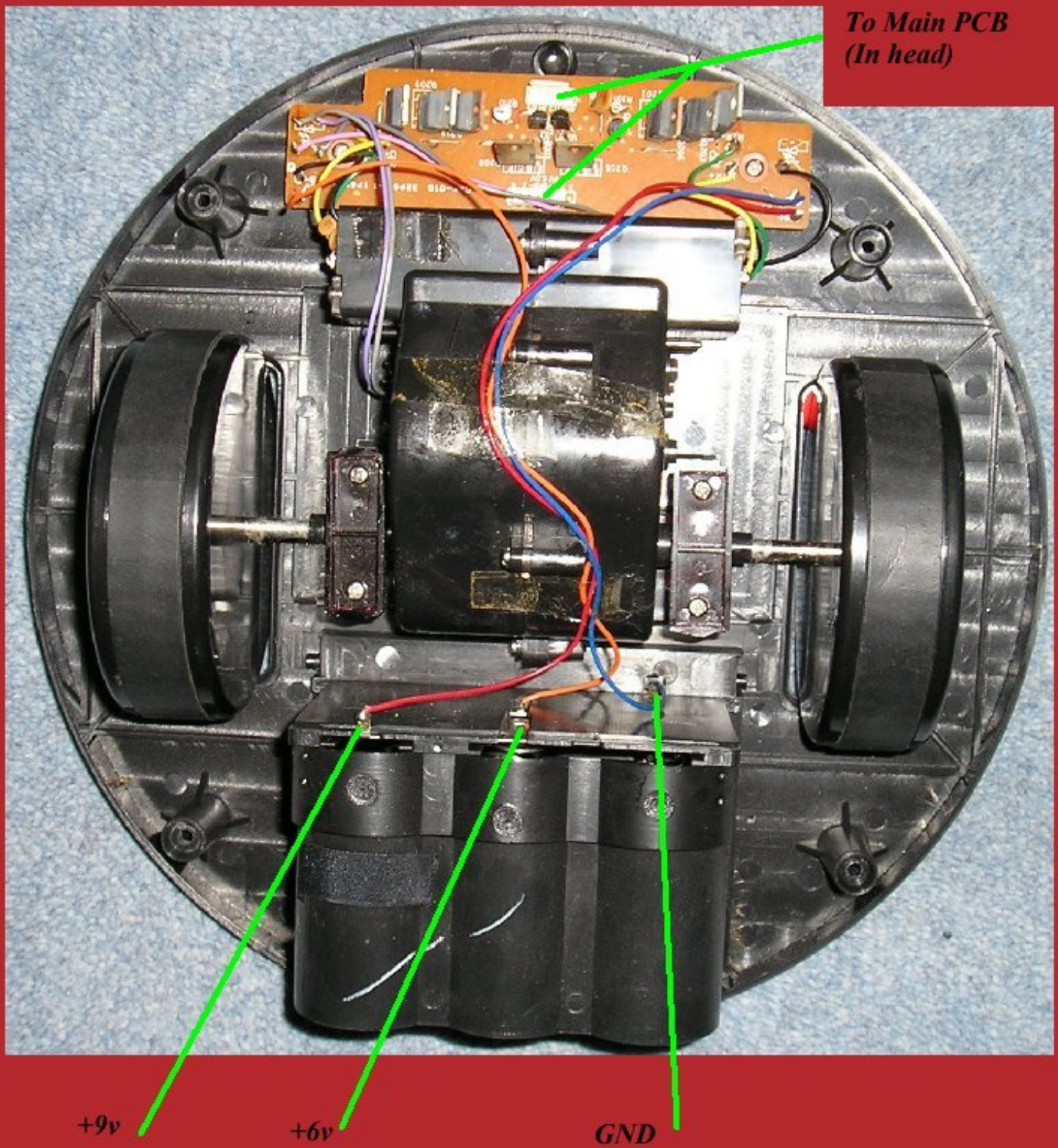


Magnetic Clutches

IR Emitter & Reciever

As this gear turns it blocks the IR and the computer counts this to determin distance and if the gear box has stalled (Obstacle)

There are two PCB's inside Petster one attached to the base it contains two H bridges for driving the motor and also has the input for the optical encoder then two sets of wires run to the main PCB located in the head containing the bulk of the electronics.

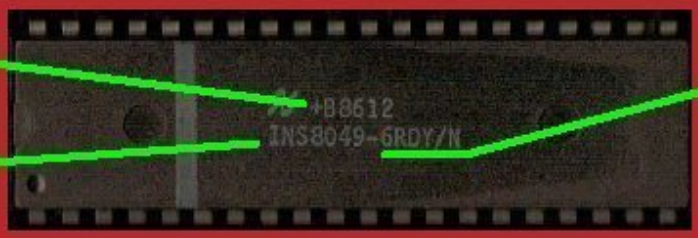


Petsters MPU is a INS8039 (for 1985 models) INS8049 (1986 models) there are as I have found so far two versions of the Petster the first has serial number ending 85 (this can be found in Pestsers battery box Eg:2385) and the second ends 86 for 1986. The 1985 model contains off chip ROM while the 1986 models have it built into the MPU. The Ins 8039/49 is a 8bit microprocessor with 128bytes of ram and 2k eprom (8049 only).

Petster Deluxe main MPU 1986 model

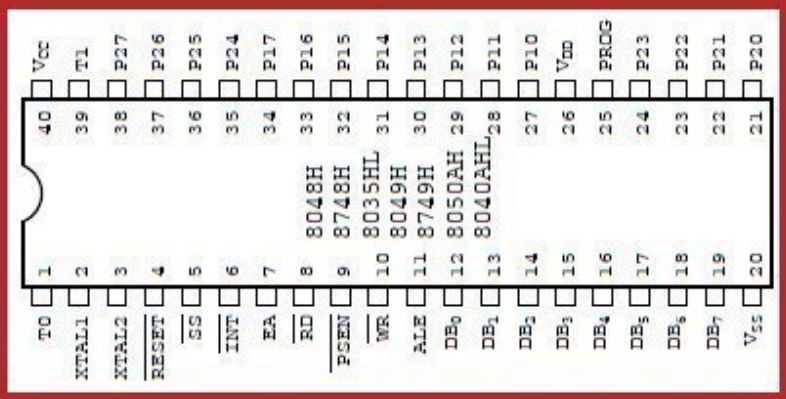
MPU Manufacture date

MPU Type



Indicates mask program this is National Semiconductors in house code for Axlons petster deluxe.

The 1985 model has a total of 10 ic's it contains a 27c32 4kb eprom of which only 2kb is used and a 74c373 octal latch for eprom interface to the MPU. There are also small subtle differences on the PCB's like the PCB part number is different so to is the trace that enables External Access (EA Pin Forces 8039/49/50 to reference external ROM) see pin out, you can convert a 1986 to a 1985 as I have done it also means that if you know how to programme the INS8039 or use the UV eprom equivalent D8749 you could rewrite the factory code this allows for a great deal of modifying like fitting the INS8050 a pin for pin compatible IC that doubles RAM and ROM!.



8039 MPU Pinout

For 1985 the Petster is quite a complex machine and it has many features greater than most other toy robots of the time .

*Anyway that's the inner workings now I will go into the operation of the Petster. You send commands to it by way of clapping in different sequences and it can also use this on a single clap to locate your position. This system works very well you can clap ant any speed and it will recognize your commands there are many different modes that maybe entered 2 autonomy modes for example. I will use the manuals methods for describing these e.g. one clap = * a pause = / there is also a 20 step programme mode and a mode where noise is converted into varying pitches of sound. To let you know what mode the Petster is currently running in It has 3 led lights on its collar red yellow and green these light in different combinations to indicate mode, for example yellow would be explore mode below is a explanation of the modes:*

(*****) Training / Program mode GREEN led
*This is a 20 step programme mode in this mode the following can be entered then executed by (**/**).*

(*) Forward
(**) Left
(***) Right
(****) Backwards
*(**/*) Mew*
(/**) Meow*

In this mode the front facing obstacle avoiding IR is not active but obstacles can be detected by the optical encoder in the gear box.

(***) Obey mode RED led
this mode follows the same commands as above but allows direct control.

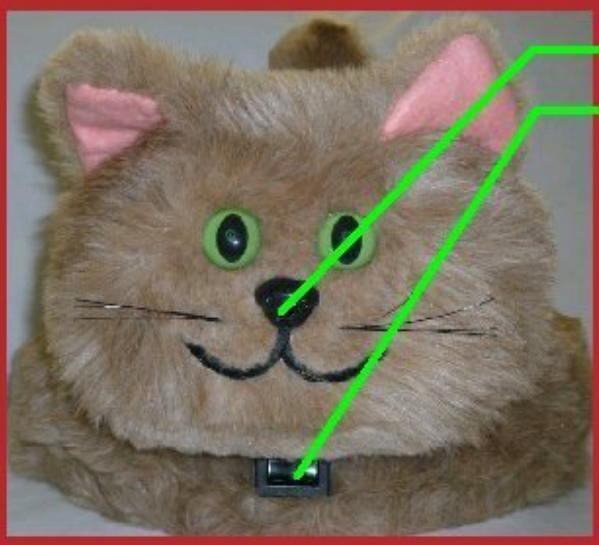
*(**/*) Act mode YELLOW & GREEN*
this mode Petster acts out different pre programmed modes

(*) Happy
(**) Angry
(***) Tipsy
(****) Thoughtful

while each set of motions is activated the front IR is active and the Petster will navigate around a object then continue its actions also the gearbox IR can sense objects to.

(****) Explore mode YELLOW led
This is one of two autonomy modes it incorporates all the modes above in ACT in a random fashion with a few other moves the time between each action can be set
(*) Execute strait away
(**) 3-5 second pause
(***) 5-10 second pause
(****) 7-25 second pause

*(***/**) Go Play NO leds*
This is the second autonomy mode and I think the best one. Petster will follow random paths but unlike other robots the Petster when detecting a object via front IR doesn't just turn a pre-set amount and continue it actually rotates on the spot scanning for a free space rotating right and left narrowing down a spot to move in to. I have tested this by blocking all but a small spot and Petster very rarely misses it, its autonomy is one of the best even from some of the modern toys and can be left to navigate even in tight spaces and it is quick with it moving very rapidly partly due to a 6v drive system, very entertaining to watch.



*(**/*) Talk RED & YELLOW led*
This too is a interesting mode any noise made up to about 3sec will be repeated in special beeps that have varying pitch I think this is borrowed from another Axlon Product that pre dates the Petster the AG Bear I don't own one but think it is similar to its talk function looking at adverts.

*(****/*) Dance mode RED & GREEN led*
this mode the Petster will activate either forward backwards left and right every time a noise is detected.

(*) Come NO led
This isn't a mode but for a single clap the Petster will triangulate on the sound and move towards it a small way with repeated claps it will find you. Again this works very well.

(**) Go Away NO led's
Like the come mode but makes the Petster move away from the sound source.

*(***/*) Go To Sleep NO led's*
This activates power down Petster rotates then shuts itself off, this mode also activates if the Petster doesn't hear anything for a while a clap or shadow going over the Pet sensor will activate it again.

On the collar is a Mode Lock switch when in locked position the Petster will stay in that mode indefinitely. The only modes that can be locked in are ones which have an LED light associated with them.
Also there is a light dependent resistor its function is as a pet sensor when it detects a change in ambient light it will make the Petster do an imitation of purring also I have found by accident that if it is completely dark and you put a bright light on the sensor it will count it as a clap (*).

Also there are the two microphones both further down the collar one on the left and one right.

The last item on the collar is the Leash Jack this is for the remote leash a cabled handset, it allows for direct control over the Petsters motors and sounds the Petster can still detect objects but only through the IR encoder in the gear box.

(This item came as standard with the Petster Deluxe.)