

## CANTAB Intellistation

The Model 80950 Intellistation™ is the latest development in the CANTAB Cognitive Testing system for non-human primates. It retains all the test specific criteria, stimulus presentation, and animal response hardware of all past systems. The heavy umbilical cable that limited the distance between the test station and central controller has been eliminated. Even the central control unit has been removed from the system. Each test station now houses an Intel® based 1.6 GHz CPU. Connect an optional keyboard, monitor, and mouse directly to the test station and it can be run as a totally independent product without the previously used expensive multi port interface. Custom software allows for remote operation of single or multi station set ups by simply connecting the test stations with a standard Ethernet cable. Either set up a small network for the test lab only or tie into an existing network. Optional packages are available to help with these configurations as needed. The CANTAB and WhiskerServer software license is now sold per station to keep the startup cost even lower!



Monkey CANTAB with Pellet Reward Model 80950

## CANTAB Test Station with Pellet and/or Liquid Reward

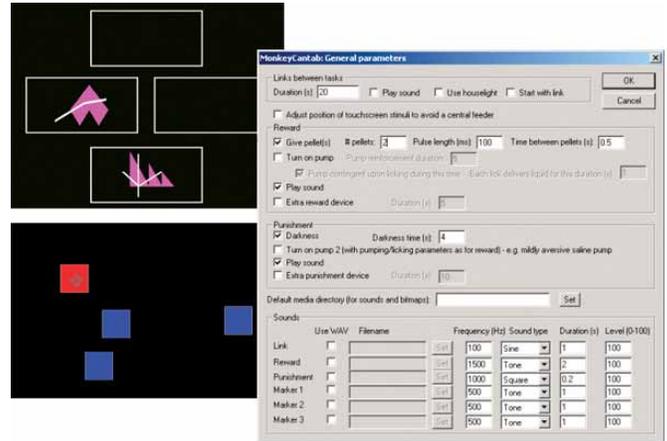
- with Pellet Reward, Model 80950
- with Liquid Reward, Model 80951

Features of these units include the 15" touch screen panel encased by a heavy duty metal frame enclosure with a fixed response lever, a house / signal light, and a receptacle. The 15" (37.78 cm) diagonal response area features a toughened splash proof IR touch-screen with LCD monitor. All components are mounted in a robust stainless steel enclosure that measures 22"W x 15"H x 12"D (56 x 38 x 30 cm) and weighs approximately 50 lb (22.5kg). There are hinged stainless steel side panels with latches that cannot be opened by an animal to access the feeder and other components.

The model 80951 Intellistation™ features Liquid-based reward as favored by users working with Marmoset monkeys, but can still be used by anyone working with other non-human primates. A centrally mounted sipper tube designed specifically for Marmosets allows for liquid reward to be delivered by a calibrated peristaltic pump with 12.2 ml/min flow rate. The specially designed lick sensor allows reward to be delivered only when the animal's tongue is detected at the sipper tube opening. If a system with both pellet and liquid reward is needed, start first with the 80950 Pellet Reward unit and add one of the optional lick tubes. A "Dog" variation is supplied for the Model 80700 or for other specified applications.

# Monkey CANTAB with Whisker® Embedded Software for all Intellistations, Model 80990

This package includes the CANTAB test applications and the basic Whisker Multimedia Suite necessary to run those applications. It does not allow you to write original programs in any of the many languages supported by Whisker. For this ability, please contact Lafayette Instrument Company. The Monkey CANTAB application portfolio comprises a battery of tests performed via a touch screen. Batteries are flexible and can be configured by the user. Multiple tests may be linked in the same subject session. Systems may be provided with pellet reward (recommended for the Rhesus monkey) liquid reward (recommended for the Marmoset) or both. A "Dog" variation is supplied for the Model 80700 or for other specified applications.



- Primate version of CANTAB – the Cambridge Neuropsychological Test Automated Battery
- Computerized Cognitive Assessment for non-human primates
- Comprises tests from the human batteries, adapted for use with non-human primates
- Facilitates a direct comparison with human data
- Facilitates comparisons with other species, e.g. rodents
- Proved results with both Rhesus monkeys and marmosets
- Windows version of the software, allowing even more flexibility to change the tests to your own design

Alterations from the human tests have been restricted to the absolute minimum consistent with the ability of the animals to learn the tasks. This facilitates a direct comparison with results from the human batteries. The excellent sensitivity of the tests and the direct comparison with human results makes Monkey CANTAB ideal for:

- the characterization of the functional organization of the brain
- the development of new and improved animal models of brain disorders
- the early identification of progressive disorders, whether endogenous or as a result of environment
- easy progression from preclinical to clinical studies

## The Monkey CANTAB battery is comprised of the following Tests:

### Reinforcement Familiarization

The aim of this program is to teach the monkeys that the onset of a tone signals the availability of reinforcement. This is the standard signal for the availability of reinforcement across all the cognitive tests.

#### Features:

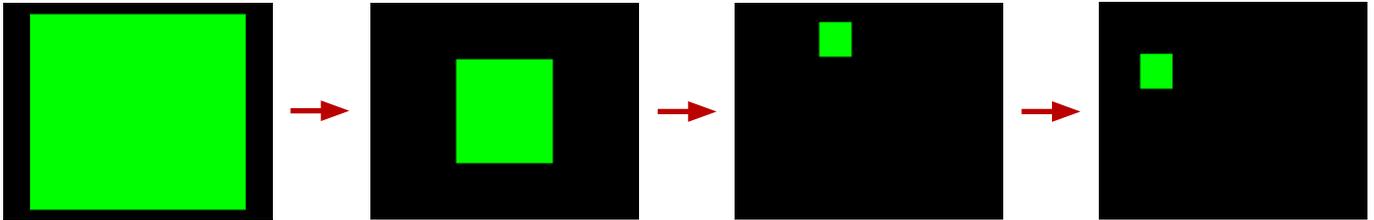
- Optional association of reinforcement with 'correct' tone.
- Reinforcement delivery optionally contingent upon an independent response (e.g. licking)

## Training Program

The aim of this program is to train the monkey to touch a solid box that is presented anywhere on the computer touch screen.

### Features:

- Up to seven box sizes
- Boxes may be one of seven colors
- A touch outside the box restarts the trial
- Reinforcement delivery optionally contingent upon an independent response (e.g. licking)

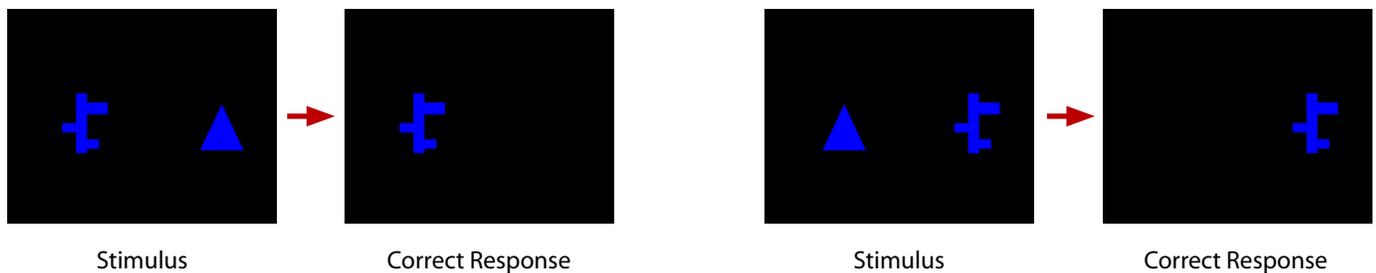


## Intra / Extra Dimensional Set-Shift and Visual Discrimination (ID/ED)

This set of visual discrimination and reversal tests can be used to study a range of cognitive processes including:

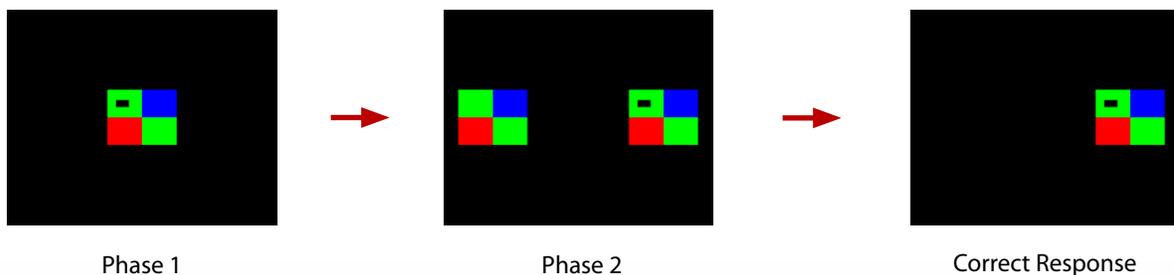
- Simple associative learning, i.e. learning that a response to a particular stimulus is associated with reinforcement
- Selective attention, i.e. learning to attend selectively to a particular dimensional property of the stimulus
- Attentional set-shifting, i.e. learning to shift attention from one dimensional property of another stimulus

The two types of test that make up this program use either 'simple' (one-dimensional) or 'compound' (two-dimensional) stimuli. The dimensions used are color-filled shapes and white lines. Simple stimuli are composed of just one of these dimensions, whereas compound stimuli are composed of both. The stimuli are the same as those used for the human test.



## Delayed Matching / Non-Matching to Sample

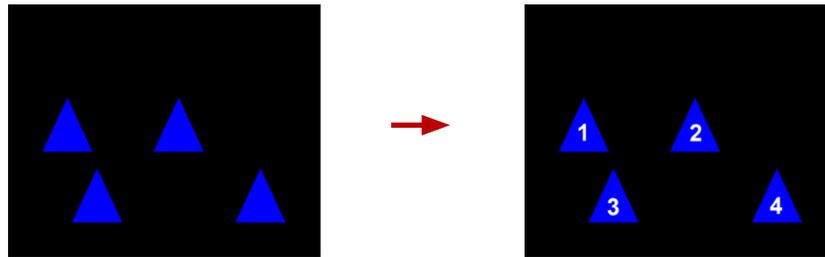
This program tests the short-term memory using a non-repeating sequence of arbitrary symbols, analogous to the use of junk objects in the WGTA. The symbols used are the same as those used for the human CANTAB Delayed Match to Sample Test.



### Spatial Working Memory

This program provides a test of working memory analogous to that tested in rodents with an 8-arm maze. A number of boxes appear on the screen with no obvious pattern. The subject must select each box in turn without revisiting a box once it has been touched. A number of options are available for training the subjects and for varying the difficulty of the task:

- 16 possible positions, four in each quadrant of the screen.
- Each trial can have 1 to 16 boxes.
- Box positions can be random or specified for each trial.
- The number of boxes in randomized trials can be increased in blocks.
- A pool of boxes may be specified to act as a source for randomization.
- Boxes can disappear or change color for any amount of time when touched.
- The whole screen can be blanked for any amount of time after each correct touch.
- There is an option to increase task difficulty by reinforcing every correct response, as opposed to only rewarding the terminal response in a trial.
- Any number of possible colors and shapes for stimuli available.
- Both initial and secondary colors can be specified for each trial.

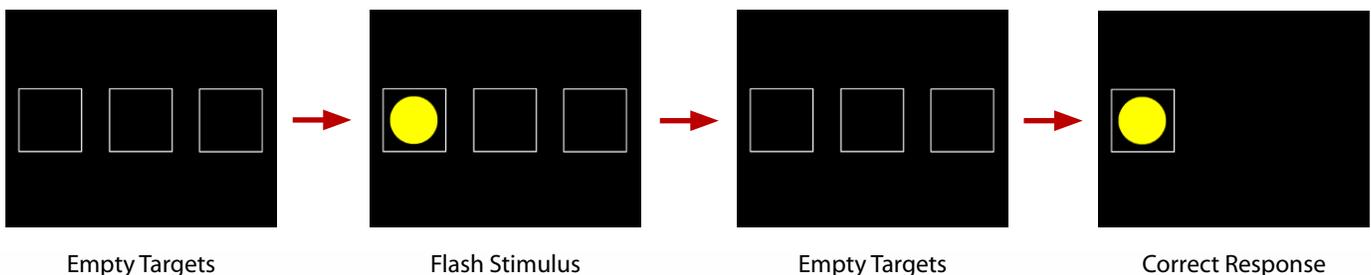


### Choice Serial Reaction Time

This task is analogous to Leonard's Five-Choice Serial Reaction Time task, which is based on the Continuous Performance test of Rosvold and Mirsky. The subject is presented with a tone (optional) and a set of empty target stimuli (typically five open circles) to signify the start of a trial, whereupon it makes an observing response by pressing a key or a screen stimulus. After a delay a target stimulus is presented for a specified duration in one of five places (e.g. a filled circle appears within one of the five open circles). If the subject touches the filled circle or the place where it was presented, it is reinforced: incorrect responses are punished. The accuracy of the response and the reaction time are recorded.

#### Features:

- Minimum key-holding time can be independent or locked to delay
- The Delay can be set from a specified list, either in the specified order or chosen randomly from the list, or can be chosen randomly by the computer between a given min and max delay.
- A list of stimuli durations can be stipulated, from which either a truly random selection is made or a pseudo random selection is made so that each delay is presented n times in a random order. (The DOS test allowed a balanced presentation of up to five delays.) Stimulus duration can also be reduced following x correct consecutive trials for training purposes.
- Frequency of stimuli between positions may be varied.
- One-choice test allows basic reaction timing. A three-choice test is also available.
- Distracter signal option.
- Both TRAINING and TESTING modes of operation are provided.



## Paired Associates Learning

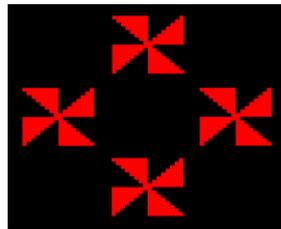
This is a conditional learning and memory task in which the location of trial-unique patterns must be learned and remembered. Human variations of the test are very sensitive to changes in early onset of Alzheimer's Disease.

### Features:

- Novel patterns on every trial.
- Each trial repeated until correct (changing order of presentation).
- Pre-training stage for task familiarization.
- Two alternative training procedures
- Six levels of difficulty - two training and four test
- Each session can have multiple (progressive) stages



Stimulus Presentation



Response Phase



Correct Response

## Schedules

This program provides conventional operant schedules of responding to a single fixed square at the center of the screen or on the response lever.

### Features:

- FR, FI, VR, VI, or Progressive Ratio
- Selectable box size and color
- Optional change of color on response
- Optional breakpoint

## CANTAB Whisker® Multimedia

Whisker is a software suite designed to control devices for behavioral research. Whisker controls many types of device. These include standard apparatus used for behavioral research like digital input devices (levers, running wheels, infrared detectors, etc.) and digital output devices (lights, motors, pellet dispensers, dippers, infusion pumps, etc.) Unlike most operant control systems, Whisker also supports advanced graphical output on multiple computer monitors, touchscreen input, keyboard and mouse input, and audio output. Whisker is the underlying platform that runs some of the most popular behavioral tasks and task suites in use today.



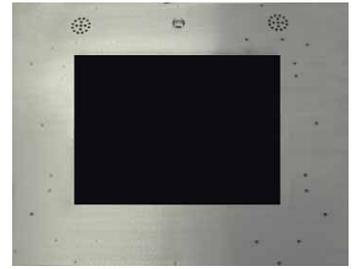
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# CANTAB Intellistation Accessories

## **Large CANTAB Wall Mount Intellistation Touch Screen Response Panel, Model 80960**

A flat display and touch screen with signal light and speakers. This style of unit was first designed for use with dogs.



## **Dog Feeder, Model 80750**

This 28 V DC Feeder will dispense small quantities of food given an appropriate control pulse.

## **Omni-directional Rod, Model 80710**

This adjustable rod is suspended from the ceiling of the test environment to orient the subject and initiate a test trial.



## **Rhesus Center Mount Lick Tube, Model 80662**

A protruding center mount lick tube which has been used with Rhesus monkeys.

## **Side Mount Lick Tube, Model 80663**

A side mount, straight sipper tube suitable for Rhesus and other species of monkeys.

## **Marmoset Lick Tube, Model 80661**

The standard lick tube included with the 80651 CANTAB Test Station.



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