

Hardware manual - BJ1 Joey*

Flight Recorder

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IMPORTANT: Before using your JOEY for any flights that you care about PLEASE familiarise yourself with the operation of the instrument.

Hardware manual - BJ1 Joey* Flight

Recorder

Description

The BJ1 JOEY* is a small, lightweight electronic data storage flight data recorder, designed to be a significant improvement over older chart recorder type instruments. Following three country approval by Australia, New Zealand and United Kingdom the BJ1 JOEY* is approved worldwide for use as a barograph for badge and record flights. Companion analysis software `JOEY TRACKS' makes for easy and meaningful interpretation of flight records turning the BJ1 JOEY* into a powerful training aid.

Operating Principle

A silicon pressure transducer measures the atmospheric pressure which is converted to digital format and altitude in the International Standard Atmosphere and stored in a low power static RAM (Random Access Memory) chip. A microprocessor chip provides timing, security and system housekeeping functions. Data from an external NMEA output GPS unit is stored also. Five external circuits are provided for motor run recording, personal markers, GPS input, NMEA output and external LED indicator. If suitable installation is made in the glider the personal marker can also be used for a tow release marker. A security function is provided in the form of an electronic lock which can be locked and unlocked by a 4 digit code number to be selected by the official observer or contest management on the day. Access to the data (which is internally encoded) is thus prevented. The construction of the BJ1 JOEY is such that attempts to access the memory chip by disassembly will result in loss of power to the chip and hence loss of stored data. Printing of stored data is done directly to an EPSON compatible parallel printer via the 25 pin connector on the BJ1 JOEY. This connector serves double duty by providing the motor run, personal marker, external LED and GPS data connections when in the glider. It is also possible to download the stored data to an IBM compatible personal computer via the 9 pin connector which serves as a standard serial port.

Technical data

Power: The BJ1 JOEY* is powered by a commonly available ALKALINE 9 volt battery. If 12 volt power is available and the external connection cable is used the Joey will use the 12 volt power. Current drain while switched "OFF" (memory is still kept alive) is 8 to 12 microamps. Average current drain while running on internal power is just over 2 milliamps. This results in conservatively a battery life of 100 recording hours over a one year period. During the battery test or memory clear cycle the battery is exercised so that if the cycle is successfully completed sufficient life remains for

even a long flight. If running from 12 volt power the current drain is in the 5 to 10mA range as the Joey remains powered up between samples and echoes the GPS input data and adds a pressure message for use by air data computer systems. Memory Storage: Over 18 hours of recording time is available at the 20 second sample rate. More frequent samples (4 or 10 seconds) result in a decreased recording time. Eleven hours is available at the 10 second rate, about 5 hours 20 minutes at the 4 second rate. Use of the 4 second sample feature at turnpoints etc will decrease the available recording time. When the memory is full the JOEY will stop recording. External connections for motor run and personal markers will cause the memory to be filled sooner depending how often they are used. Accuracy: The pressure sensor and data convertor system is temperature compensated to +/- 0.5 hP over the range -15 to +50 deg. Celsius. System accuracy for altitude differences is estimated to be +/-0.3%. The BJ1 JOEY* automatically zero references the altitude to 1013.2 hP(sea level in the International Standard Atmosphere) Measurement range: -1000 to over 40,000 feet.

Getting Started

Label affixed to instrument is reproduced here:

BORGELT BJ1 JOEY* Flight Recorder

Power switch to `ON' towards red LED. Fanfare sound.

MODE SELECT - use rotary switch and press grey `ENTER' button

DATA ENTRY - use rotary switch to select number and press `ENTER'

Setup/Test Modes:

#B - Battery Test. Low battery is indicated by continuing fanfare sound.

#C -Set for GPS (0 for none, 1 for NMEA), Default fix accuracy (0 to 7),
PC download baud rate (0 for 9600, 1 for 4800, 2 for 2400)

#D - Set Sample rate(0 for 4 seconds, 1 for 10 seconds, 2 for 20 seconds),
Fast Sample rate time period in Minutes (1 to 5)

Operation Modes:

#0 - CLEAR memory, 3 ENTERs AFTER one ENTER to activate Mode 0

#E -SECURITY LOCK, Enter 4 digit PIN (Optional)

#1 - Date Entry, 6 digits(Optional, overridden by GPS date if available)

#2 - RECORD. Power ON. Recording begins.

#3 - Unlock security. Enter 4 digit PIN

#4 - Parallel print to EPSON compatible printer.

#5 - Serial download to PC. *.IGC format

See manual for explanation of other modes and further detail.

WARNING: Removal Of Battery Clears Memory

Before using your JOEY for the first time it is necessary to configure the instrument

This procedure is outlined below.

CONFIGURATION:

As supplied the BJ1 JOEY* will always work as a GPS flight recorder, however you should configure the instrument, using modes C and D, to your desired state.

(i) Turn the power switch "ON". (towards red LED) and a "dee dah dee dah" sound will be heard. If nothing happens, return switch to "OFF" position, wait until a short low pitched beep is heard and switch on again.

(ii) Rotary switch to position C. Press grey ENTER button. JOEY will beep.

Rotary switch to position 0(no GPS, barograph only) or 1(NMEA GPS) The Joey will default to GPS mode on next use anyway. So if you want to use barograph only mode you must set this each time.

(iii) Press ENTER button. JOEY will beep.

The No GPS configuration means that the Joey will work as an electronic barograph only and will not collect GPS data even with a GPS connected. There is a reduction in power consumption in this mode and a corresponding increase in battery life. This mode also saves paper on the parallel printout. The default mode on every power up is GPS Flight Recorder mode (barograph function will work even if no GPS data)

(iv) Next set the default fix accuracy. This can be any number from 0 to 7 inclusive. However do not select 7 as the flight analysis program may not recognise data points as valid GPS points. Factory number is 2. Select the number using the rotary switch and press the grey 'ENTER' button. The Joey will beep. This number is used by the display program if the GPS doesn't provide one.

(v) Finally set the PC download data rate.

Rotary switch to position 0 (output data rate to 9600 baud)

or position 1 (output data rate to 4800 baud)

or position 2 (output data rate to 2400 baud)

or position 3 (output data rate to 1200 baud)

(v) Press ENTER button. JOEY will beep. JOEY will emit 'dee daa' sound.

Note: If you have changed the output data rate you MUST change the data rate set in the FLIGHT ANALYSIS program to match your new setting. This can be done under OPTIONS - SETUP. e.g. on the ComCommand line change the COM1:9600,n,8,1 to COM1:4800,n,8,1 to change to 4800 baud (slower) download rate. To change the communications port to COM2 (your mouse may be on COM1) change the line to COM2:4800,n,8,1 Save the changes to preserve this setting for future use. See JOEY TRACKS Flight Analysis Program help files for more details.

(vi) Rotary switch to position D . Press grey 'ENTER' button. Joey will beep.

Rotary switch to position 0,1 or 2. Press grey 'ENTER' button Joey will beep. "0" sets

4 second sample rate, "1" sets 10 second rate, "2" sets 20 second rate.

Rotary switch to position 1,2,3,4, or 5. Press grey `ENTER' button. Joey will beep and emit `dee daa' sound. The number represents the number of minutes that the 4 second sample rate runs for when the marker button is pressed. After this time period the sample rate reverts to the previously selected value. If the marker is pressed again during the fast sample rate period an additional sample is taken and it is marked as a marker on the flight record.

Turn power OFF.

Note: Mode D may be entered and used after power up without first entering mode C. Configuration will survive battery changes without being lost.

Badge and Record Flights where security is required.

1. Hand the Official Observer (O.O) the copy of your JOEY manual and get him/her to read this section and the `Note to Official Observers'" on page 6.
2. Turn the power switch "ON". (towards red LED) . The "dee daa dee daa" sound will be heard. If nothing happens, return switch to "OFF" position, wait until a short low pitched beep is heard and switch on again.
3. It is necessary to clear the memory of any previous flights This should be done by the O.O.

After the startup cycle turn rotary switch to position 0 and push the grey ENTER button to select the MODE 0. Valid button presses are marked by a short beep. The memory is wiped by pushing ENTER three more times. A "dee dah" sound indicates that the memory has been cleared. A rising tones sound will then be heard and the red LED will flash for several seconds followed by a "dee daa" sound. If the rising sounds keep repeating the battery will need replacement. See section Battery Replacement. Selection of Mode B will test the battery without clearing the memory.

4. Security PIN number entry by O.O.(You may use any of the 16 alphanumeric characters, not just numbers)

Turn the rotary switch to position E, press ENTER to select MODE E. (a beep is heard), now select the first digit of the chosen PIN number and press enter again. Repeat until all four digits are entered whereupon a series of rising tones is heard signifying successful entry of the PIN number. Note that you cannot set a new PIN number until any previous PIN is cleared, this prevents anyone from overriding the security unless they know the current PIN number.

If a PIN number is inadvertently entered and not known, either clear the memory using mode 0 (as above) or simply remove the battery, wait 30 seconds and replace it. (See section BATTERY REPLACEMENT). In either case stored data will be lost.

Example: Observer uses PIN number 2468

Operator JOEY

E

ENTER beep
2
ENTER beep
4
ENTER beep
6
ENTER beep
8
ENTER Rising tone

Security is now set, printouts are disabled

5. Date Entry (Optional, most GPS units will supply a date which will over-ride any date you enter) If used with Borgelt B100 GPS you will need to enter the date as the date is not supplied in the NMEA messages.

Turn the rotary switch to position 1 and press ENTER.(a beep will be heard for a valid button press) MODE 1 is now selected. The date can now be entered in any format. This is done by turning the rotary switch to each digit required, then pushing the enter button to store the selected number. A beep will be heard after each valid button press. After the sixth digit has been entered a "dee daa" sound will be heard. If a mistake has been made just continue by entering 6 more digits until the "dee daa" sound is heard again. This date entry is optional(see above) and will be over-ridden by the GPS date if available.

6. RECORDING Turn the rotary switch to position 2. No Enter button press is necessary. The LED will flash every 4 seconds. At this time the JOEY may be securely mounted in the aircraft.

IF THE JOEY IS BEING USED WITH THE EXTERNAL CABLE IT IS RECOMMENDED THAT YOU ATTACH THE CABLE BEFORE TURNING THE JOEY ON IN MODE 2.

The LED continues to flash at 4 second intervals(double flash at GPS recording) showing that the instrument is active. The rotary switch should be left on position 2, any other selection will sound a warning tone and stop data recording.

After the flight, remove JOEY from aircraft, turn the power switch to the "OFF" position. A short low pitched beep will be heard at the end of the current recording interval.

6. Secure Printout (Data Retrieval)

The BJ1 JOEY has been designed to dump to the simplest parallel printer (EPSON compatible). Make sure that there is enough paper in the printer, and a standard printer cable with DB25 plug on the free end is attached to the printer. i.e. simply detach the printer cable from the rear of the PC. A PC itself is not required for secure printouts. Proceed by switching on the printer and adjusting the printer settings for no auto line

feed, no auto page feed. (Failure to do this will result in excessive paper use, blank pages etc.) More sophisticated printers can generally be set to an EPSON emulation mode.

Turn JOEY power ON and wait for startup cycle to finish. As security has been used it is necessary to enter Mode 3. Turn rotary switch to position 3 and press ENTER, a short beep will be heard.

Now re-enter the original PIN number BUT REPLACE THE FIRST CHARACTER WITH THE NUMBER 3. If a mistake is made a "falling tones" sound is heard. Turn off and start again. You get eight tries, after which the memory is erased. When the PIN has been entered correctly a "rising tones" sound is heard and data printout (MODE4) and dump (MODE5) are enabled.

Example: Observer PIN number was 2468

Operator JOEY

3

ENTER beep

3

ENTER beep

4

ENTER beep

6

ENTER beep

8

ENTER Rising tone

Security is now cleared, printouts are enabled.

Plug the BJ1 JOEY into the printer cable (The BJ1 connector fits the standard Centronics type parallel printer cable, mating with the DB25 plug).

Turn rotary switch to position 4 and push the grey ENTER button. MODE 4 is now selected and a beep is heard. After a few seconds the flight will be printed out. Extra copies of the flight may be printed out at this time by pushing the ENTER button again. This may be repeated as often as desired.

Disconnect the BJ1 JOEY from the printer and turn OFF. DO NOT FORGET TO SWITCH OFF THE JOEY. A battery saver feature ensures that the Joey will turn itself off after 3 minutes if you forget.

NOTE:

Setting altitude units in parallel print.(Barograph only mode, in GPS recorder mode altitude units are meters.)

(i)Turn power on and wait for startup cycle to finish

(ii)Turn rotary switch to position A to select feet or to 8 to select meters

(iii)Press ENTER (a beep will be heard and the LED will flash, confirming entry)

(iv)Select mode 4 and dump to printer.

(v) Turn power off.

This altitude units setting is not effective for anything other than the user friendly printer dump. In this mode there are 10 samples per line across the page, times are down the left side of the page.

Note 1: In the event that the Official Observer has lost the PIN number s/he should contact the factory. We will then give her/him a factory code to enable the PIN number to be deleted and the information to be retrieved. S/he MUST then return the instrument to the factory for a new code to be inserted. If flight data is not required, clearing memory with Mode 0 or removal of battery will result in loss of data including clearing PIN number.

Note 2: Altitudes are relative to the Standard Atmosphere reference of 1013.2hP

Note 3: Using the marker button will capture high and low points.

Printout Explanation:

The samples are at selected intervals one per line.

Markers occupy their own lines.

Across the page you will see:

UTC Lat Long Alt: Press GPS Accuracy

UTC is the time from the GPS or the time since recording began if no GPS was available.

Lat and Long are self explanatory.

Alt: Press is pressure altitude referenced to 1013.2 hPa

Alt:GPS is GPS altitude. Altitude units are meters. All badge claims are in meters anyway.

In JOEY TRACKS the altitude units may be set to feet. If a serial dump to the JOEY TRACKS program is performed full GPS data is available.

O.O. see page 7 for further guidance on analysing the printout. Can I also download the flight to my PC to allow use of the flight analysis program?

Yes, AFTER the O.O. has performed the secure download of your flight, you may perform a serial dump to your PC. see page 10 below.

Other modes:

Mode 6 parallel prints direct to a printer the *.IGC file.

Mode 7 Serial prints in human readable format(Same as Mode 4 but via serial)

Mode 8 sets barograph only print to meters.

Mode A sets barograph only print to feet.

Mode F is factory mode. You cannot access this mode.

Normal Operation - Other Flights when security is not required e.g. fun flying, instruction, competition practice etc

Simply omit the entry of the security PIN (step 4). There is then of course no need to

unlock the security in the printout procedure. Usually when security is not used the data dump will be to a PC without a printer dump. If memory is not cleared, the next flight record will follow the previous one, allowing several flights to be saved consecutively and dumped at one time.

WARNING: keep in mind the maximum recording times. See page 2 Memory Storage).

Download

How do I download the flight to my PC to allow use of the Flight Analysis Program?

1. Connect serial cable (supplied) to the serial port of your PC and the other end to the 9 pin DB connector on the JOEY.
2. Turn ON the PC and start either the JOEY TRACKS Flight Analysis program or a PC communications program such as PROCOMM, TELIX, QMODEM, TERMINAL if using WINDOWS etc

The communications settings are N,8,1 9600 baud. Ensure that the serial port that the cable is connected to is the one currently selected in the JOEY TRACKS Flight Analysis program or the selected communications program.

3. Download via JOEY TRACKS Flight Analysis program - choose menu heading FILE , select GET DATA FROM JOEY switch ON JOEY and follow the instructions on the screen. If after several tries, the data has not been successfully transferred to the PC, it is suggested that you use a PC communications program -see 4. below. See BJ1 JOEY TRACKS Flight Analysis Program help files for further details.

4. Download via PC communications program - (also see 2. above)

Set the communications package for local communications no parity, 8 data bits, 1 stop bit, 9600 baud. To download use the normal ASCII (TEXT) file download procedure saving the file to your JOEY directory with a name ending in .IGC e.g. MYFLIGHT.IGC

Use of the extension .IGC ensures that the file can be stored by the BJ1 JOEY TRACKS FLIGHT ANALYSIS PROGRAM and displayed on the PC screen. See the JOEY TRACKS Flight Analysis Program help files for more details.

When the program indicates that download is in progress, turn ON JOEY, turn rotary switch to 5, press ENTER to select MODE 5. You will see the data appear on screen. At the end of the data, a message `end of record' will appear. Follow the program instructions on screen to end the download. It is important to end the download properly to avoid partial loss of the data. Exit out of the communications program, disconnect the JOEY and turn OFF to save the battery. Start up the JOEY TRACKS Flight Analysis Program and view the new *.IGC file.

AFTER DUMPING DATA DO NOT FORGET TO SAVE THE BATTERY BY TURNING THE BJ1 JOEY* POWER OFF!

A battery saver mode has been provided if you forget. After 3 minutes the Joey will switch itself off.

Printout (Data Retrieval) See 6. Secure Printout (Data Retrieval) on page 4. Go straight to MODE 4 to enable printout as security does not need to be cleared.

BATTERY REPLACEMENT

Turn the BJ1 JOEY* power OFF. Remove the four countersunk screws on the case half opposite the instruction label. This case half then can be removed giving access to the battery. Remove old battery from snap connector and replace with new.

CAUTION! BE CAREFUL WITH POLARITY. DO NOT TOUCH BATTERY AND CONNECTOR TERMINALS WITH REVERSE POLARITY!

Try to cleanly connect the battery with one try. Intermittent contact may cause the Joey to start and stop resulting in an internal program "hang".

Following change of battery , if LED remains ON, turn the POWER switch ON, wait a few seconds and turn off. If operation doesn't appear normal, remove battery, wait 30 seconds and replace battery cleanly.

Replace case half taking care to align screw holes and replace screws taking care not to cross thread. Do not replace with longer screws as damage may result.

External Connections

BJ1 multicable allows POWER, MARKER button, EXTERNAL LED and GPS CONNECTIONS to be made via DB25 plug. The BJ1 multicable contains shielding and rf filtering which provides protection against radio frequency interference.

Engine Run detector

- the engine run detect circuit is pins 18 and 19 in the DB25 plug.

pin 19 - ground

pin 18 - active

any voltage of greater than 2 volts with respect to ground will cause the JOEY to record 'engine on'. This can include DC voltages, positive going pulses or AC voltages as long as the positive peaks are in excess of 2 volts. Extremely effective overvoltage and reverse voltage protection is built into this circuit.

Contact BORGELT INSTRUMENTS or your supplier for a suitable multicable with optional engine run detector cable.

Notes on GPS recording

A double flash of the LED signifies that GPS data recording is occurring. GPS data is recorded every 4,10 or 20 seconds. In addition GPS data is recorded at markers.

Operation at extremely low temperatures

If operating at high altitudes in low ambient temperatures for long periods you can ensure correct functioning of the BJ1 JOEY by ensuring that the temperature of the instrument does not fall below MINUS 15 deg. Celsius. This may be achieved by locating the instrument inside the pilot's clothing or by placing the instrument between two unfrozen freezer icepacks and insulating the bundle by wrapping in foam, spaceblankets or other insulating material. The freezer packs will take several hours to freeze solid under these conditions, ensuring that the temperature cannot fall much below zero degrees Celsius until this has occurred.

NOTE TO OFFICIAL OBSERVERS AND CERTIFICATES OFFICER

Read 'Normal Operation - Badge & Record Flights' on page 6.

Do not let the pilot know the PIN number you used. Write it down so you don't forget it. Contact the factory if it is lost and we will tell you how to retrieve the data. You must then return the instrument to the factory for a new code to be entered.

Interpretation of the raw printout for official verification purposes is easy as it is very simple to see that the pilot has not landed and taken off again. Long periods at the same altitude indicate a landing.

The numerical printout of altitude makes height gain determination easy also.

On a 1000 meter Silver C height gain the span accuracy is +/-0.3% or on 1000 meters +/- 3 meters or 10 feet. Add the possible inaccuracy due to temperature to this (+/- 0.5hP or about 9 meters (30 feet)) at both bottom and top of the climb and you need to see 1000 meters + 21 meters (3281+ 70 feet) to be absolutely sure of the height gain. For a Gold C height gain we can eliminate the span accuracy as a calibration run is required for this climb. This leaves the temperature inaccuracy. At higher altitudes 0.5 hP corresponds to a greater height difference. At 10000feet 1hP corresponds to about 12 meters or 40 feet so the margin must be $9 + 12 = 21$ meters ($30 + 40 = 70$ feet). For a diamond gain 1hP corresponds to about 18 meters or 60 feet at the top so the total margin must be $9 + 18 = 27$ meters ($30 + 60 = 90$ feet)

NOTES TO CALIBRATION LAB

Read in conjunction with Normal Operation - page 6

Start the BJ1 JOEY* recording in 4 second data storage interval, (see configuration page 4,5,6) and place in pressure chamber. Run the altitude up to known levels and hold for 20 seconds at each level. Return to ambient holding at any desired levels for 20 seconds.

Print out trace on printer and sign. If gross inaccuracies are found return to factory for repair/adjustment.

If verifying a marginal height gain ascertain the low and high points from the printed flight data dump provided and bracket these with 500 or 1000 foot levels held for 20 seconds. This will allow easy interpolation for maximum accuracy.

DISCLAIMER:

BORGELT INSTRUMENTS believes that this instrument is reliable and accurate when used as instructed. However BORGELT INSTRUMENTS or their agents assume no responsibility or liability for the use of this instrument or for any loss or damage suffered by the user or other party during or as a result of the use of this instrument.

WARRANTY:

If under normal operating use, any part of the BJ1 JOEY* hardware excluding battery, proves defective in material and/or workmanship within the warranty period of twenty-four months from date of purchase, such defective parts and/or workmanship will be repaired by BORGELT INSTRUMENTS or their agent. Freight charges are to be borne by the owner. This warranty is not transferable. This warranty does not cover damage caused by misuse, neglect, accident, reversal of power polarity or repair attempts by unauthorised personnel and will be voided if any part of the instrument is disassembled except under specific authorisation by the manufacturer.

SERIAL NO:

DATE PURCHASED:

SUPPLIER:

OWNER:

ADDRESS:

PHONE:

FAX:

STANDARD FACTORY CONFIGURATION is:

Flight Recorder with GPS

20 second recording

2 minute fast record period

altitude in METERS

OUTPUT BAUD RATE 9600 BAUD

JOEY: QUICK GUIDE TO PROBLEM SOLVING

The following are some commonly seen initial problems reported by customers. Most problems are caused by unfamiliarity with the JOEY so we ask that you please read the manual BEFORE trying to make your JOEY function. We also ask that, before embarking on a flight that matters to you, you ensure that your JOEY is working correctly and that you are familiar with its operation.

PROBLEM: My JOEY won't dump data and I get an UNLOCK PIN message.

SOLUTION: This is caused by a PIN being accidentally inserted. Be careful not to enter MODE E unless you wish to use the security feature. You can return your JOEY to normal operation by removing and re-inserting the battery. See pages 3 and 6 of the JOEY Operating manual.

PROBLEM: My JOEY apparently won't perform a serial data dump to the PC without problems such as corrupted data files or error flags during attempted downloads.

SOLUTION: See CONFIGURATION

This problem can be caused by the baud rate being set too high. Some PC's will allow downloads from the JOEY at 9600 baud while some trip up at this speed. Try setting the download baud rate to 4800 or 2400 or in extreme cases 1200 baud.

PROBLEM: The JOEY TRACKS FLIGHT ANALYSIS PROGRAM hangs when attempting a serial download.

SOLUTION: This should not happen if the correct port, Baud rate are selected on both the JOEY and in the analysis software and the JOEY is connected to a correctly configured serial cable when attempting a download. Check all of the above.

PROBLEM: My JOEY won't download GPS data or record markers.

SOLUTION. Make sure that the GPS data cable is correctly connected to the BJ1 multicable and the GPS is correctly set to output NMEA0183 data at 4800 baud.

PROBLEM: I want to use my JOEY but I can't because I loaned it to my friend last week and s/he hasn't returned it yet.

SOLUTION: Get him/her to buy his/her own JOEY.

Software Manual -

JOEY TRACKS FLIGHT ANALYSIS PROGRAM

This software package provides display and analysis support for the JOEY Flight Recorder(IGC file format models)

This text file describes some of the features of the JOEY TRACKS analysis software supplied with the Joey. It consists of two executable MS DOS files TASKSEL.EXE, JOEY.EXE and support files. You will need a PC(IBM compatible) running MS DOS 3.1 or later at least 640k RAM and a VGA screen. Color is VERY helpful. The software is designed to support analysis of flight data files in *.IGC format.(Format sanctioned by the International Gliding Commission as its flight data file standard.) If you have a previous version of the Joey Flight Analysis software, place all those files in another directory. C:\Joeyold is suggested.

To install the software, change to the drive the floppy is in and type INSTALL<ENTER>. Follow instructions on screen. This program has been tested on a number of DOS machines and on PCs running WINDOWS 3.1 and 3.11. It ran without problems from DOS and in a DOS box in WIN 3.1x. If using WINDOWS 95 the software may be installed from a DOS box but will not necessarily run successfully in this. If you have problems, it is suggested that you run JOEY TRACKS in DOS mode. During the WIN95 shutdown process you are given the option of restarting the machine in DOS mode. Do this and then change to the Joey directory to run TASKSEL.EXE or JOEY.EXE. Downloads for the Joey Flight Recorder worked properly at 9600 baud on all machines tested.

Please note: for the mouse to work in WIN 95 DOS mode, a DOS mouse driver is required.

On line help is available (F1) and the help files and screens should be thoroughly explored before attempting to use the analysis software. It is assumed that users are reasonably familiar with modern personal computers. If you are new to PCs it is suggested that you find a mentor and learn at least the basics before contacting Borgelt Instruments.

The two executable program files are TASKSEL.EXE and JOEY.EXE

Using TASKSEL

TASKSEL.EXE lets you create and store tasks out of a given site in a *.tsk file. In order to do this you must have a list of turnpoints in *.map file format for that area.

MAP FILES

Examples of *.map files are given (TOOW.MAP, HORSHAM.MAP, THELOT.MAP) These map files may be examined by opening a map file and selecting EDIT, then EDIT MAP. You will see the text file in DOS editor. NEW MAP and selecting EDIT will show you a text file header for a new map.

You may also display the map file in graphic form on screen by opening a map file and selecting DISPLAY, then MAP. You will see the file on screen. By clicking the left or right mouse buttons on screen on map points you will see in the top left the numbers describing layer, color, shape, etc for that point. You may click on points with different color, shape or size symbols and see how the numbers change.

F1(HELP) will give you a key. F2 and F3 let you add or edit map points on screen. By putting the two cursors on screen the zoom and unzoom functions (Z and X respectively) are activated. You should now be able to create a *.MAP file for your

area of interest using the same format as the example files.(use a word processor or DOS EDITOR and save as a text or ASCII file. DOS editor does this automatically. If you create a large file incorporating all the turnpoints likely to be used from many sites you can extract site specific turnpoints using the EXTRACT facility in TASKSEL. EXTRACT will also let you create a map file along a line and including any given width along the line.

CREATING A TASK FILE An example of a task file is supplied called TOOW.TSK with 4 tasks in it.

Select FILE, OPEN TASK, highlight TOOW.TSK, select OK and you will see the task list on the left. Highlight the desired task, click the left mouse button and you will see the details of that task.

By highlighting the turnpoints in turn, details of the legs are seen in the statistics window. When finished selecting and viewing task statistics, select CLOSE.

You may now display the task by selecting DISPLAY. If the map file for the area is opened also you may display the task superimposed on the map. By using the two cursors you may examine the task and see how close any point is to any other. For example, distance from landing fields on any leg or from controlled airports etc.

BE AWARE that YOU will be responsible for the accuracy of the result as YOU will create your own MAP file. The files supplied with the program are for example purposes only and Borgelt Instruments and J&K Microsystems take **NO RESPONSIBILITY** for their accuracy.

Now open a map file (Toow.map) and a task file (Toow.tsk) and plan and store a new task in the Toow.tsk file. Select EDIT, EDIT TASK and then NEW TASK (at bottom of screen).

Have a look at the appropriate help file.

Put a task ID in the Task ID box(usually a number, say 5) Then put a short description of the task in the description box(for example: 300triangle)

Click in the Turnpoint list box. If you type the first letter of the turnpoint name, you are taken to the turnpoints beginning with that letter. (Saves lots of scrolling)

Click in the takeoff space, click on the name of the takeoff place in the map file list and transfer the name to the Takeoff box using the SPACEBAR.

Repeat for the landing point.

Click in the turnpoint list box. The box is highlighted the same as the Takeoff and Landing slots. The first point is the START and the last is the FINISH.

Select the START point from the map file list as for the Takeoff and Landing points by using the SPACEBAR. Repeat for the remaining turnpoints and FINISH point.

When satisfied select DONE, SAVE, QUIT

If you want to create tasks out of another site(say KINGAROY A/D), do not open a *.TSK file, just a map file. Otherwise the procedure is the same. When you wish to save the task the program will prompt you for a Task file name.(DOS filename format) Type this name in the box at lower right.(for KINGAROY, King.tsk is suggested) You may of course use other map files.

CONVERT can be used to convert your MAP and TASK files into GARMIN format for upload to GARMIN GPS receivers as *.WPT(waypoint) and *.RTE (route) files. This is done without you having to buy the Garmin upload software thanks to Ron Henderson who wrote G7TO.EXE Please see ABOUT under the TASKSEL HELP files for extra acknowledgement of the software that does this and where you can get the latest version of G7TO.EXE(Version 3.00 is supplied) You will need a Garmin to PC cable.

Using JOEY

JOEY.EXE is the Flight Analysis program itself.

Two flight file examples are provided.

Flights are stored automatically in JOEY\FLIGHTS and tasks and maps in JOEY\TASK. Flight files are given IGC compliant filenames, however you may rename them (during the download process or later) as long as the name does not have more than 8 characters and retains the .IGC extension.

To demonstrate the program, from C:\JOEY type JOEY <ENTER> Look at the HELP files under F1-HELP at the right hand end of the menu bar.

Select FILE, LOAD MAP(Toow.map), LOAD TASK(Toow.tsk, highlight task 3 and select it), OPEN IGC FILE(75MBUE4.IGC and select it). When the IGC file is loaded you will see in the status bar at the bottom of the screen the names of the IGC, MAP and TASK files that are open.

Select DISPLAY, ALTITUDE to look at the altitude record or GROUND TRACK to look at the ground track of the flight. F1 will give you the key and mouse commands for each display.

NOTE that you can mark thermals in the ALTITUDE display using the two cursors and view the data for each thermal (average rate of climb etc) and add the thermal to the thermal statistics file.

Once all the thermals are marked you will also have an interthermal statistics file. Thermal marking is done manually to allow the user to set the beginning and end of thermalling and to ignore any insignificant climbs. The two cursors also work in the ground track mode allowing you to find the time, distance and speed between any two points as well as distance of the flight track from any map point. The time location of the cursors is the same on the altitude and ground track displays allowing you to find the geographic location of the thermals.

By marking any one point, of course, you can display the data at that point.

Using the cursors the wind direction and speed may be determined from drift in thermals as well as average speed between two points.

The two cursor feature and mouse support provided by this program makes it, in our opinion, the most powerful and convenient to use flight analysis program. There is the facility to display the start, finish and turnpoint sectors on screen and find the average speed for the task. A single keystroke (N) moves you to the next turnpoint.

FAI sectors and startlines as well as circular "beercan" sectors are catered for.

Explore the two example flights then go fly your own and examine them.

You may notice that occasionally there appears to be a discontinuity on the ground track trace. This is caused by temporarily invalid GPS data making such data easy to detect.

The example flight 74BUE4.IGC was flown by Ron Sanders on 10 September 1997 in his Discus TOP VH-GXF. ANZAC.IGC was flown by Mike Borgelt and Adrian Jansen in the Nimbus 3 DM VH-ZAF on the 25th April 1997.

Using JOEY TRACKS for contest verification.

You may load the task file after creating it for the day in question using TASKSEL. Individual *.IGC files then may be loaded and compared to the task. IGC files from other manufacturers Flight Recorders will be handled by JOEY TRACKS.

Click cursor one on a data point just before crossing the start line, then press "Y" to mark it, a data point in sector at the first turn point then the other turnpoints in turn and just after crossing the finish line. A text file *.THS containing start and finish times will be created. This file may be viewed to confirm its presence and correctness.

These *.THS files for the day may be exported to scoring programs.

Comments on the program and the text files may be sent to: Mike Borgelt

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Frequently asked questions:

Q. There doesn't appear to be flight file present after recording

A. Check that the Joey is flashing every 4 seconds when it is meant to be recording with a double flash every time a GPS sample is taken.

Q. The map view shows zero latitude and longitude.

A. The GPS probably wasn't sending valid data when the Joey started up. Edit the flight file to remove the lines with zero lat and long.

This may also be caused by selecting "7" for the default GPS accuracy. Use another number, 2 is suggested.

Q. After downloading I get a "Repeated FVU header" error.

A. Multiple flights were present. Valid IGC files can have only one header message. Use your DOS editor or a wordprocessor to split the files into the individual flights and

save the resulting files as text(also called ASCII) files. This is not normally a problem in contests as you should clear the memory each morning before flight.

Q. I get download problems.

A. Windows NT may cause problems or Windows 95 may be configured on your machine so as to cause problems with serial communications(other programs may be trying to access the same com port). Remove conflicts.

Likewise you CANNOT successfully download to a com port which has a mouse driver installed and active (you can't use the mouse to set up for download , then unplug the mouse and plug in the Joey cable.)

Q. I have trouble printing from Win95

A.The print setup from within Win95 is as follows:

Go into the task bar, and select Settings: Control Panel. Double click on Printers. Set up the printer you want, installing drivers if not already done. On the printer panel, select Details tab. Ensure the printer port is set to where the printer actually is (LPT1: or wherever) In Spool Settings, select "Print directly to the printer" You have the option of printing a test page from this panel - do so if there is any doubt that the printer is not working, and follow the help instructions if you have further trouble.

Once this is set up, and the JOEY program setup has the GRAPHICS driver loaded in its setup page, with the correct settings for your printer, the JOEY program should print correctly, using <Ctrl> P to print from the graphics pages. Read the DOS help file about GRAPHICS for how to set up this program for your printer.

DO NOT use the <Print Screen> key. This sends output to the Windows clipboard, not to the printer, and also doesn't turn off colors before printing - unless you have a color printer, and want to load the image into a graphics program and print from there. In this case, open the graphics program, paste the clipboard into it, then edit as you want, and print from there.

August 15th 1998