

OTS Merge – RS232 / RS422 Multi Stream Merge

Introduction

The OTS Merge is a small but indispensable box that allows the data from multiple timing units to be merged together into a single RS232 or RS422 connection.

This is very useful for merging multiple radio controls into a single stream for wired or radio transmission.

Data is collected from either SportIdent or EMIT timing hardware. Each packet received is buffered and then retransmitted merged with the other data packets on the output stream.



OTS-Merge Technical Specification

- Accepts up to Four RS232 input streams
- Generates one RS232 or RS422 output stream
- RS422 output via optional adaptor plug
- Supports multiple timing systems hardware
- Typical battery life of 24 hours

Supported SportIdent Timing Hardware:

BSM7-D-RS232 configured as an AutoSend Control Station operating at 4800 baud
BSM6-D-RS232 configured as an AutoSend Control Station operating at 4800 baud

Supported Emit Timing Hardware:

Online Control operating at 9600 baud

There is also an extended EMIT mode where the unit inserts a TimeStamp into the EMIT packet to allow accurate time calculation on the receiving end. However the receiving software needs to support this mode.

External Interfaces:

- Four RS232 9Pin D-Type Male Connectors (Inputs)
- One RS232 9Pin D-Type Female Connector (Output)
- Four Configuration DIP switches
- One Power switch
- Battery Compartment – Accepts 2 x AA Batteries

Operating Conditions:

Product testing shows that a typical operating lifetime from a single set of Duracell or equivalent AA batteries is over 55 hours. This figure is recorded from real-life automated testing where the test unit was merging a packet every 10 seconds (over 19,000 in total). During the test the device was operating at a temperature of between -5°C and 5°C.

Osprey Ordering Information

Order Code	Description	RRP
GPP-OTS-MERG	OTS 4-Way RS232 / 422 Merge Kit	£POA

Case Study 1 – Orienteering Radio Control

It was decided that for the commentary to be most valuable that the furthest control on the Elite Classic race should be a radio control. The radio hardware to be used at the control site only accepted a single data RS232 stream, however the expected number of competitors through the site meant that up to 3 timing devices were to be used.

An OTS_Merge unit was deployed to merge the three streams together so that they could be connected to the radio transmission hardware.

Case Study 2 – Orienteering Finish Line

There are four finish boxes at the finish line of an orienteering event to allow multiple competitors to finish simultaneously. The commentators need immediate confirmation of competitors actual times on the finish line. The four finish units are plugged into a OTS-Merge. Using the RS422 adaptor the data is transmitted back to the commentary box over 200m using a standard cable with RJ45 connectors.

Instructions For Use

- 1) Fit new batteries. A set of Duracell AA MN1500 batteries will last over 24 hours constant use.



- 2) If the merge output data is to be sent for more than 10m, it is necessary to use RS422 and standard Cat 5 cabling. Fit the RS422 Dongles at both ends of the Cat 5 cabling as shown. Note: The dongles for each end are wired differently, and the grey dongle must connect to the Merge unit output while the Purple Dongle is for connecting to the PC.

- 3) Set the configuration switches as shown in the table below.

Switch number	1	2	3	4
SportIdent	'CONFIG' side UP	'CONFIG' side UP	'CONFIG' side UP	'CONFIG' side UP
EMIT	'CONFIG' side UP	'CONFIG' side UP	'CONFIG' side UP	CONFIG' side down
EMIT Extended Mode	'CONFIG' side UP	'CONFIG' side UP	'CONFIG' side down	CONFIG' side down



- 4) Connect the Controls to be used to the inputs 1,2,3 and 4
- 5) Switch the unit on with the on off slide switch
- 6) Check that the red lights flash when data is sent through the unit.

Appendix

EMIT Extended Mode

Since the EMIT online control packets do not contain a timestamp, if the commentary software wants to do any accurate timing calculations on the received data we recommend enabling the EMIT Extended Mode. In this mode the OTS hardware inserts a timestamp field into the EMIT packet immediately after the start of packet character.

<STX>'M'<OTS Hardware Address><Boot Count><Time Stamp><TAB><Rest of original EMIT packet...>

<STX> = The original EMIT start of frame

<M> = Character 'M' to signify the Mode field

<OTS Hardware Address> = Two ASCII characters giving the OTS hardware address "30" = 0x30

This is used to identify the OTS hardware that inserted the Timestamp field

<Boot Count> = Two ASCII characters giving the Initialisation Counter "02" = 0x02. This is used to calculate the zero of the Timestamp field. This counter is stored in non-volatile memory and wraps when it reaches 0xFF.

<Time Stamp> = Six ASCII characters giving a copy of the timestamp counter when the packet was received. The timestamp counter is reset when the OTS hardware is rebooted and the boot count will be incremented at that moment too. The Time Stamp field counts up and wraps when it reaches 0xFFFFFFFF.

The timestamp counter runs from an internal 32.768kHz clock and increments 7.8125 mS (128Hz).