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## Description

### Applications

These tags can be used in applications where long range, multi-read, high-speed item identification is required. The tag uses a chip containing a pre-programmed 64-bit unique ID code and 14 x 64-bit lockable pages of user EEPROM data. When powered up by the reader RF beam, the tag spontaneously transmits its ID code, and if configured for "TTO mode", its ID is followed contiguously by 1 or more other selected pages of user EEPROM. These pages can be written to, read, and locked by reader commands to the tag. Data integrity can be assured by appending CRCs to the data, and authenticity can be guaranteed by writing encrypted data into one or more memory pages. This tag is ideally suited to transport management, and was specifically designed for windscreen attachment.

### Chipset

X4TTO (EM4444)

### Tag Construction

- § Tag consists of a glob-topped chip on a flexible transparent printed antenna substrate, 170mm x 10mm x 0.1mm
- § Adhesive strip for windscreen mounting; minimal skill required to affix
- § Antenna tuned for operation on glass
- § Cut-line to prevent removal of intact tag



ENP tag on windscreen

## Key Features

- § Available for most spectrum allocations, including FCC, ETSI, ICASA, ACA, WPC, etc
- § Tuned for windscreen glass
- § Anti-tamper feature (breaks if removed)
- § Long read range
- § Robust anti-collision protocol – up to 30 tags can be read simultaneously
- § Compatible with all IP-X Read/Write and Read-Only tags in mixed populations
- § Compatible with all IPICO UHF readers
- § Factory programmed 64 bit ID number
- § User writable 14 pages (each one is a 64-bit block) of EEPROM
- § EEPROM blocks lockable after writing
- § High tag read rate – about 200 tags/sec in a multi-read application (UID only)
- § Fast moving tags can be read – up to 300 km/h (UID only)
- § Passive – no battery
- § High tag data transmission rate – nominally 256 kbit/sec
- § Frequency independent chip – (used at frequencies from 315 MHz to 2.45 GHz)
- § Tamper proof (cannot be peeled off intact)
- § -40 to +85° C

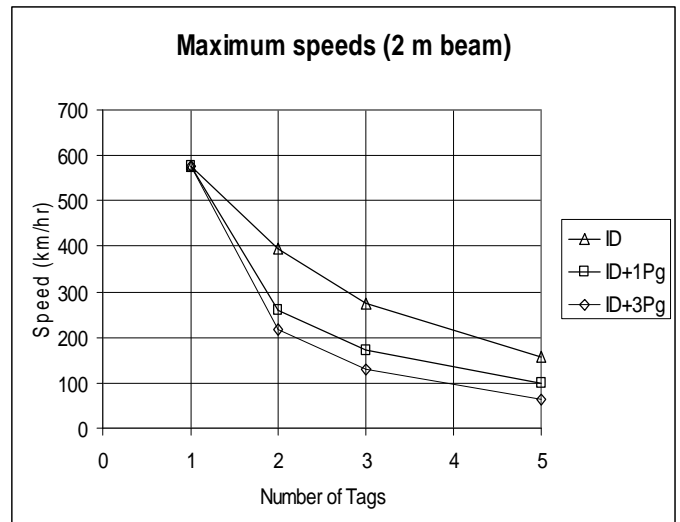
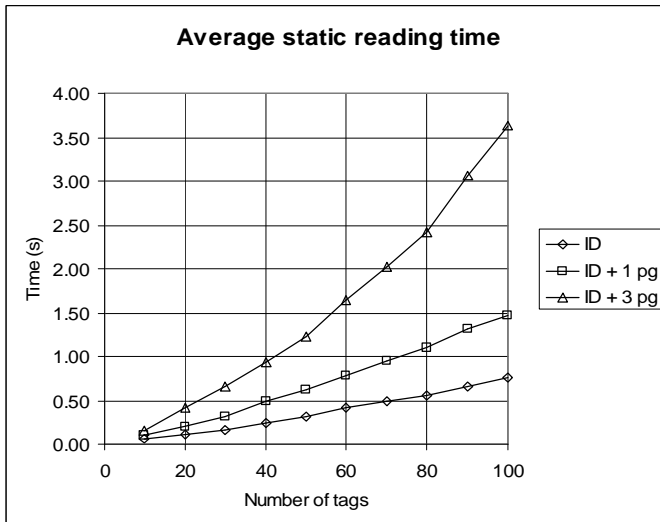
## Multi-Read Performance (No. of tags readable at high speed)

(Tags assumed to remain in beam over 2 m distance)

Speed version	Tag Speed	UID	UID + 1 page	UID + 3 pages
<b>V501</b> (bit rate = 256 kb/s, max interval = 4 kbit)	500 km/h (139 m/s)	1	1	1
	200 km/hr (56 m/s)	4	3	3

## Specifications

Device name	IP-X UHF Smartlabel		
Part Description	IP-X X4t-V501-rff-S-ENP		
Power requirements	No batteries (passive back-scatter)		
Antenna	Printed antenna on flexible substrate		
Life Expectancy	Virtually indefinite		
Environmental	Operating temperature range: -30 to +70C Storage temperature range: -40 to +85C Humidity: 5 to 95% non-condensing		
Physical	170mm x 10mm x 0.1mm, with adhesive strip. Mass of roll (2,500 tags) = 1.50 kg		
Read Range	2 - 7 m (Depends on reader power output and configuration)		
Tag Data rate	256 kbit/s typical		
Max Tag speed	Depends on number of tags present simultaneously. See Multi read Performance Table on page 1 and graph below		
ID Length	64 bits (16 bit CRC)		
Programmability	Factory programmed Read-only Unique 64 bit ID (UID); 896 bit user writable & lockable EEPROM		
Protocol Saturation	Protocol optimised for high speed applications (e.g. few fast moving tags simultaneously in the reader beam)		
Multi-read rate (Time to read 100 tags)	UID only = 0.76 sec. TTO mode: UID + 1 page = 1.5 secs, UID + 2 pages = 3.6 secs		
EEPROM memory map & timing	Page 0	Page 1 - 14	Page 15
	64 bits, factory programmed UID	64 bits, user programmable	64 bits, configuration settings
Write timing	< 40 msec (includes Write command + data transmission + verification read-back)		
Page read timing	< 10 msec to read 3 pages		
Write range	4 m (reader power = 4 WEIRP)		



## Typical read range

Reader power	0.5W ERP	1 W EIRP	4 W EIRP	8 W EIRP
Region/Regulator	Europe/ETSI	Australia/ACA	South Africa/ICASA USA/FCC	
Read range (m)	1 - 2	2 - 3	6 - 8	10

## Ordering Information

Product name	Ordering code	Description
X4TTO UHF tag, 170x10 ENP RWTTO	IP3214	IP-X X4t-869-V501-S-ENP
X4TTO UHF tag, 170x10 ENP RWTTO	IP3233	IP-X X4t-915-V501-S-ENP