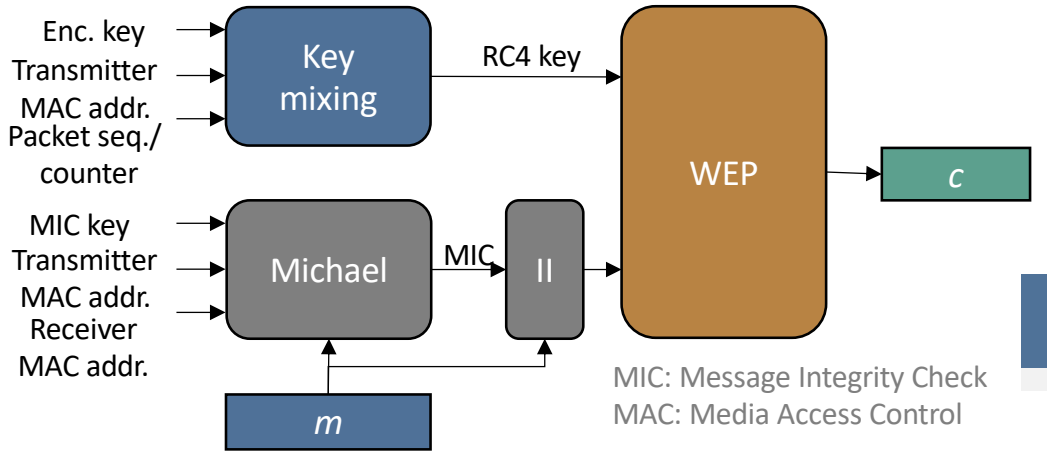
Wi-Fi Protected Access (WPA) -

deprecated
(2014)

IEEE 802.11i-draft
(2003)

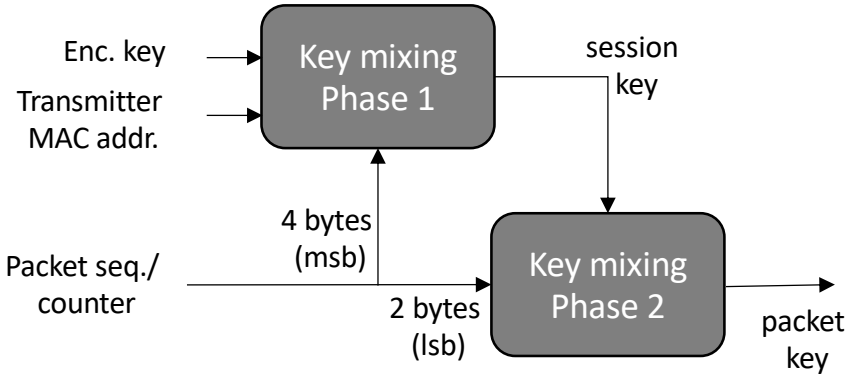


MIC: Message Integrity Check
MAC: Media Access Control

KCK: Key Confirmation Key
KEK: Key Encryption Key
TK: Temporal Keys

Sizes	
	Packet seq.: 48 bits
	MIC: 64 bits

Key Mixing



- *Integrity*: MIC instead of CRC
- *Lengths*: larger (e.g., Packet seq. vs. IV)
- *Key management*: key per package (packet no. to avoid replay attacks)
- *Attacks*

Temporal Key Integrity Protocol (TKIP)

Pairwise Master Key - PMK (256 bits)

Pairwise Transient Key PTK (512 bits)

EAPOLMICKey (128 bits) (KCK)	*EAPOLEncKey (128 bits)* (KEK)	*DataEncKey (128 bits)*	*DataMICKey (128 bits)* (TK)

TKIP Pairwise Key Hierarchy

$$PTK = f(PMK, NonceAP, NonceSTA, MAC_{AP}, MAC_{STA})$$

Group Master Key - GMK (128 bits)

Group Transient Key GTK (256 bits)

DataEncKey (128 bits)	*DataMICKey (128 bits)*

TKIP Group Key Hierarchy

$$GTK = f(GMK, NonceAP, MAC_{AP})$$