

# MAREX & ARISS-RUSSIA

Personal Message System (PMS)  
Upgrade project for ISS

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# Introduction

## ISS Ham - Current Packet station

- Supports an entry level Packet Mail System
- Uses PacCom TNC and Ericsson Radio.
- 1200 Baud Email and Digi-Repeater
- 64k memory storage for Email.

# Introduction continued

## MAREX Packet Upgraded Project

- Supports all existing features of current ISS-Ham System
- Uses Kantronics KPC-9612 TNC
- Uses Kenwood D700 Radio
- Data Rates: 1200 - 56K Baud
- 512k memory storage for Email
- Full Remote Control support

# KANTRONICS KPC-9612



# Current ISS hardware

- Ericsson Transceiver and PacCom TNC
- PacCom TNC is locking up every 2 months, which requires crew intervention
- Changes to TNC parameters requires crew support

# Packet Upgrade Hardware Overview

- Transceiver: Kenwood TM-D700
- TNC: Kantronics KPC-9612

# TNC: KPC-9612 Features

- 1200 - 56K Baud data rate
- 512kbyte RAM
- Orbiting Store and forward Mail box
- Fully remote controllable by System Operators on Earth
- Expandable support for two radios

# TNC: KPC-9612 Flight History

- Successfully flown on Mir 1997 - 2000.
- Proven space flight reliability
- Earth based System operators maintained the PMS file system without ISS crew intervention.
- Proven compatibility with Kenwood radios



# KPC-9612 Software Enhancements Required

- ISS ROM Settings Pre Burnt
- Log off Banner Message
- Buffer overflow protection

# 9600 Baud, Faster than 1200

- 9600 Baud will offer a realistic data transfer rate of 4x.
- More users will be able to access the mail box during the typical 10 minute window.

# More Data per Pass

Efficiency in Characters per Second

	35%	65%
1200	42	78
9600	336	624

Efficiency in Characters per Minute for an 8 minute pass

1200	20,160	37,440
9600	161,280	299,520

# Development Schedule

- Kenwood TM-D700: Need status from ARISS-RUSSIA
- KPC-9612:
  - ROM update from Kantronics pending
  - Waiting for final letters of approval from ARISS and a schedule for flight
  - Ready to deliver to ARISS in Q2 of 2003.

# 2003 Installation Configurations

## 2Meters

## 70 CM

- D700 & KPC 1200 baud
- Ericsson & PacCom
- Ericsson & PacCom
- D700 & KPC 9600 baud
- **D700 & KPC 9600 baud**
- **Ericsson & SSTV**

# TNC Comparison Features

Feature	KPC	PacCom	D700
9600 Baud	Yes	NO	Yes
Remote Ctrl	Yes	Problems	NO
Software Support	Yes	Problems	Dificult
Current Production	Yes	NO	Yes
Memory	512k	64k	112k

# Future KPC-9612 Upgrades-1

- Kantronics is planning on providing some basic upgrades for free:
  - ROM Burn
  - Log off banner
  - Buffer overflow protection

# Future KPC-9612 Upgrades-2

- New features can be added if ARISS and sponsors wish to pay for the enhancements
  - Multiple user mail box access
  - Dual radio mail box support
  - Mail pending beacons
  - Expanded beacons



# Summary

- The Packet Upgrade Project will help solve some of the existing problems we are experiencing with the current system.
- It will provide an expandable platform for the next 2-3 years.
- It is ready for deployment.
- Let's go for it!

# Power Supply Load

	Min	Transmit	Power W (13vdc)
● Kenwood TM-D700			
● Low "L" TX 5w	300 ma	3000 ma	39
● Medium "M" TX 10w	300 ma	4000 ma	52
● High TX 45w	300 ma	10,000 ma	130
● Kantronics KPC-9612	45 ma	45 ma	1
● Maximum Total Loads	345 ma	3045-10,045	40 - 131 watts
● The Power load of the KPC-9612 is not a significant factor.			