Northern Tasmania Amateur Radio Club Inc.

NTARC endurance ride tracking system

Hardware: Andre' Bochenek   VK7ZAB

Software: Ken Clark   VK7KKV and   Peter Sulzberger   VK7SP

The system is computer based with a spreadsheet interface for entry/display of rider times through checkpoints for each ride event.

Data entry is manually done into spreadsheet when rider's time through the checkpoints is radioed back to base.

If RFID readers are used at checkpoints then the rider's card/tag numbers are sent over our portable 70cm repeater back to base and automatically loaded into the database and displayed on the same spreadsheet.

We use amateur packet radio for this card/reader number transfer. One checkpoint set-up, the plastic crate, is some of the equipment used in the 1990s. Instead of TNCs being controlled from a PC, Commodore 64 etc. we use an Arduino micro-controller. The AX.25 packet we send doesn't use APRS encoding and is for one to one operation.

Each event is published as a web page on a local server and available on our public Wi-Fi setup. They are also displayed on monitors in public space near the communications base.

jRFID - NTARC RFID Tracking System

File   Database   Tools

Control | RFID System | Tag Writer

UTC   2019-12-13 10:45:36
Local   2019-12-13 11:45:36

Server IP   127.0.0.1

AERA IP   10.13.79.2   ☐ Off
AERA Port   81

Serial Communications

GPS ■   RFID ■   TAG ■

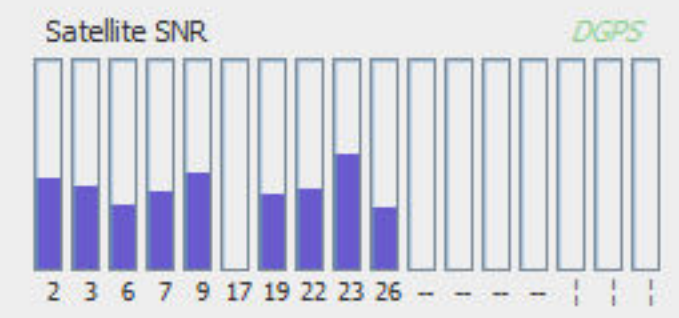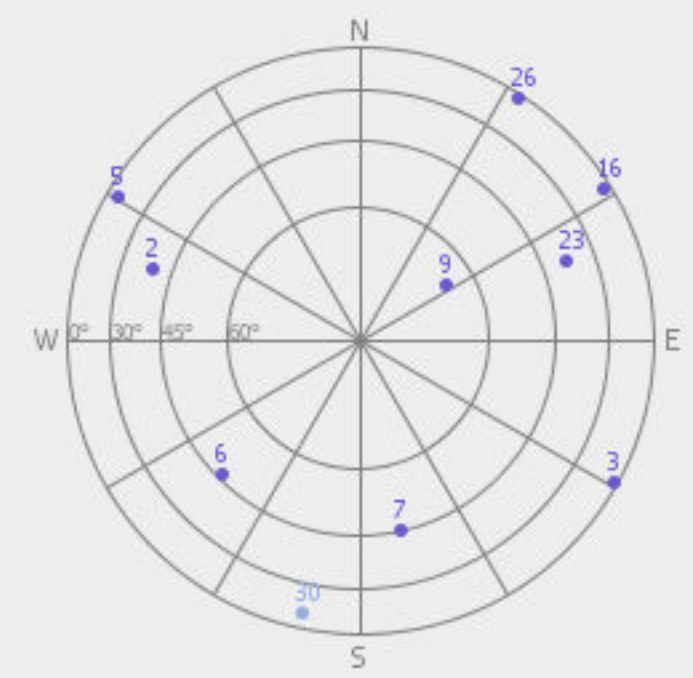Data Connections

SQL ■   MSA ■   AERA ■

Latitude   47.635975 °   PDOP   1.6   Fix   3D
Longitude   009.195030 ° HDOP   0.9   Mode GPS
Altitude   455.7 m   VDOP   1.3

Serial Port Settings

Prolific USB-to-Serial Comm Port   Not selected   Not selected

GPS Port	Baud Rate	RFID Port	Baud Rate	Tag Port	Baud Rate
● COM11	○ 4800	○ COM11	○ 4800	○ COM11	○ 4800
○ COM12	○ 9600	○ COM12	○ 9600	○ COM12	○ 9600
○ COM21	○ 19200	○ COM21	○ 19200	○ COM21	○ 19200
○ COM22	● 38400	○ COM22	● 38400	○ COM22	● 38400
○ COM23	○ 57600	○ COM23	○ 57600	○ COM23	○ 57600
○ COM24	○ 115200	○ COM24	○ 115200	○ COM24	○ 115200
○ None		● None		● None	

N

26

5   16

2   23

9

W 0° 30° 45° 60°   E

6   3

7

30

S

Satellite SNR   DGPS

2 3 6 7 9 17 19 22 23 26 -- -- -- -- ┊ ┊ ┊

System Time Synchronisation
   at 2019-12-13 10:35:43

jRFID - NTARC RFID Tracking System

File   Database   Tools

Control | **RFID System** | **Tag Writer**

UTC   [2019-12-13 10:47:13]

Local [2019-12-13 11:47:12]

Serial Communications

GPS 🟩   RFID 🟥   TAG 🟥

Data Connections

SQL 🟩   MSA 🟩   AERA 🟥

Event complete, all riders registered at Base.

RFID Reader & AERA ETS Gate Times

Time Stamp	RFID	Reader	Gate Notification
11:17:01	31713733	0	1659R0
11:16:54	-	0	RFID heart beat
11:16:25	40171160	0	1659R0
11:16:24	-	3	RFID heart beat
11:16:14	-	2	RFID heart beat
11:16:04	-	1	RFID heart beat
11:15:38	16088157	0	1659R0
11:14:11	24487761	0	1659R0
11:11:13	76268421	0	1659R0
11:11:00	26677214	0	1659R0
11:10:17	40150495	0	1659R0
11:05:58	70491	0	1659R0
10:53:48	35357438	0	8029R0
10:53:29	26192235	0	8029R0
10:52:51	09955320	0	8029R0
10:52:24	25236990	0	8029R0
10:52:22	45601913	0	8029R0
10:52:06	146205	0	8029R0
10:51:39	09613469	0	8029R0
10:51:24	61689551	0	8029R0
10:51:23	41564203	0	8029R0
10:51:23	94504320	0	8029R0
10:51:06	58031729	0	8029R0
10:50:05	70058	0	8029R0
10:49:45	70084	0	8029R0

Gate & Rider Status Messages

Time Stamp	Reader	Message	Status
11:36:39	9	Bib No: 37 (160 km) --> Vetted Out	Closed
11:36:39	9	Bib No: 17 (160 km) --> Vetted Out	Closed

RFID System Time Synchronisation
   at 2019-12-13 11:06:08

Excel — 54000.xlsm - Microsoft Excel

A215

|					8010	8011	8012	8013	8019	8020	8021	8022	8023	8029	
Event 80 km	☐ Publish HTML	☐ Strapper Call	☐ Auto update		Leg 1	Leg 1	Leg 1	Leg 1	Leg 1	Leg 2	Leg 2	Leg 2	Leg 2	Leg 2	
	RIDE Date / Start Time	Refreshed	--:--:--	Elapsed	40 km	35 km	19 km	5 km		40 km	35 km	19 km	5 km		
	2020-08-22 07:00			Time	Base »	CP1	CP2	CP3	» Base	Base »	CP1	CP2	CP3	» Base	
Bib No.	Name	RFID	Status	hh:mm:ss.s											
333	Ainslie, Rebecca	40150495	Finished	08:27:32.0	07:00	07:28	08:28	09:55	10:24	11:26	11:57	13:02	14:52	15:27	
332	Aitchison, Jillinda	24975576	Vetted Out	04:01:30.0	07:00	07:20	08:11	09:27	10:01	11:01	-	-	-	-	
78	Alsop, Angus	89591830	Finished	07:40:19.0	07:00	07:27	08:19	09:34	10:03	11:08	11:38	12:40	14:11	14:40	
77	Barker, Tim	64224603	Finished	07:40:15.0	07:00	07:27	08:19	09:34	10:03	11:08	11:38	12:40	14:11	14:40	
4	Bowkett, Helen	57574387	Finished	09:00:29.0	07:00	07:38	08:41	10:12	10:39	11:45	12:16	13:29	15:21	16:00	
176	Burford, Greg	68086525	Finished	08:40:46.0	07:00	07:41	08:49	10:18	10:57	11:57	12:22	13:26	15:07	15:40	
83	Clark, Angie	68742883	Finished	06:36:57.0	07:00	07:28	08:20	09:29	09:50	10:50	11:12	12:01	13:16	13:36	
285	Dawkins, Amy	87317269	Finished	08:17:04.0	07:00	07:35	08:40	10:06	10:34	11:35	12:01	13:06	14:51	15:17	
212	Downes, Yvonne	41564203	Finished	08:20:26.0	07:00	07:29	08:35	09:57	10:28	11:29	11:57	13:10	14:51	15:20	
237	Ford, Kiana	91688978	Finished	08:38:38.0	07:00	07:30	08:32	10:08	10:37	11:40	12:10	13:14	15:04	15:38	
306	Goulding, Jessica	04759751	Finished	08:23:00.0	07:00	07:26	08:31	09:57	10:24	11:25	11:57	13:04	14:51	15:23	
218	Graham, Samantha	59324613	Finished	09:24:22.0	07:00	07:38	08:52	10:32	11:02	12:11	12:43	14:05	15:53	16:24	
179	Grull, Debbie	09955320	Vetted Out	03:34:38.0	07:00	07:35	08:40	10:07	10:34	-	-	-	-	-	
79	Hill, Shannon	38981871	Finished	06:01:22.0	07:00	07:17	08:02	09:07	09:29	10:29	10:47	11:32	12:40	13:01	
228	Kelly, Melissa	21076316	Finished	09:24:26.0	07:00	07:38	08:52	10:30	11:03	12:11	12:43	14:05	15:53	16:24	
48	Lamprey, Asha	34434344	Finished	07:51:52.0	07:00	07:35	08:44	10:09	10:35	11:35	11:59	13:01	14:25	14:51	
113	Lockhart, Kirstie	06664758	Finished	06:01:18.0	07:00	07:17	08:02	09:07	09:29	10:29	10:47	11:32	12:40	13:01	
80	Lockhart, Noel	34606962	Finished	06:01:16.0	07:00	07:17	08:02	09:07	09:29	10:29	10:47	11:32	12:40	13:01	
200	Matheson, Kristy	72859846	Vetted Out	03:34:43.0	07:00	07:35	08:40	10:06	10:34	-	-	-	-	-	
324	McCoy, David	92336303	Finished	08:38:33.0	07:00	07:29	08:32	10:08	10:37	11:40	12:10	13:14	15:04	15:38	
136	Mitchell, Kaye	05905603	Finished	06:18:14.0	07:00	07:23	08:08	09:16	09:36	10:36	10:54	11:43	12:53	13:18	
186	Napier, Amelia	59121116	Finished	08:40:40.0	07:00	07:41	08:49	10:18	10:46	11:47	12:13	13:27	15:08	15:40	
329	Napier, Molly	58354649	Finished	07:51:59.0	07:00	07:35	08:44	10:09	10:35	11:35	11:59	13:01	14:25	14:51	
106	Neilley, Shane	42201372	Finished	07:43:57.0	07:00	07:24	08:21	09:43	10:10	11:10	11:38	12:43	14:20	14:43	
122	Nicklason, Gerald	14690056	Finished	06:37:06.0	07:00	07:20	08:11	09:25	09:44	10:46	11:12	12:03	13:15	13:37	
334	Parr, Halla	88377468	Finished	09:00:38.0	07:00	07:32	08:38	10:09	10:39	11:47	12:15	13:26	15:21	16:00	
68	Parr, Janine	41104052	Vetted Out	08:07:10.0	07:00	07:32	08:38	10:09	10:39	11:46	12:15	13:26	-	15:07	
66	Pickering, Bella	34697827	Vetted Out	05:00:29.0	07:00	07:40	08:44	10:08	10:37	11:38	12:00	-	-	-	
38	Purton, Tony	04047200	Vetted Out	03:02:29.0	07:00	07:25	08:15	09:27	10:02	-	-	-	-	-	
137	Shoobridge, John	94891682	Finished	07:38:38.0	07:00	07:24	08:20	08:47	10:09	11:10	11:38	12:43	14:10	14:38	
300	Smith, Raelene	81532315	Finished	06:37:13.0	07:00	07:20	08:13	09:16	09:36	10:36	11:00	12:01	13:15	13:37	
100	Smith, Trish	45182949	Finished	07:53:12.0	07:00	07:29	08:28	09:50	10:19	11:21	11:49	12:57	14:25	14:53	
165	Taylor, Danielle	64665322	Finished	07:52:05.0	07:00	07:40	08:43	10:08	10:37	11:38	12:00	13:01	14:21	14:52	
339	Verdouw, Lara	76268421	Finished	08:17:00.0	07:00	07:32	08:38	10:07	10:35	11:38	12:01	13:06	14:51	15:17	
254	Wyllie, Deborah	67959424	Finished	08:40:57.0	07:00	07:29	08:36	10:03	10:33	11:40	12:10	13:15	15:09	15:40	
	35	0	35												
Statistics	Riders	Active	Inactive		Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	
				Riders to complete:											
Missed Gate error!				Last Rider:	7:00	7:41	8:52	10:32	11:03	12:11	12:43	14:05	15:53	16:24	

Ride event sheet

Typical checkpoint setup: 235 x 235mm reader panel with 5 M cable to transceiver unit which has a simple ground plane antenna.
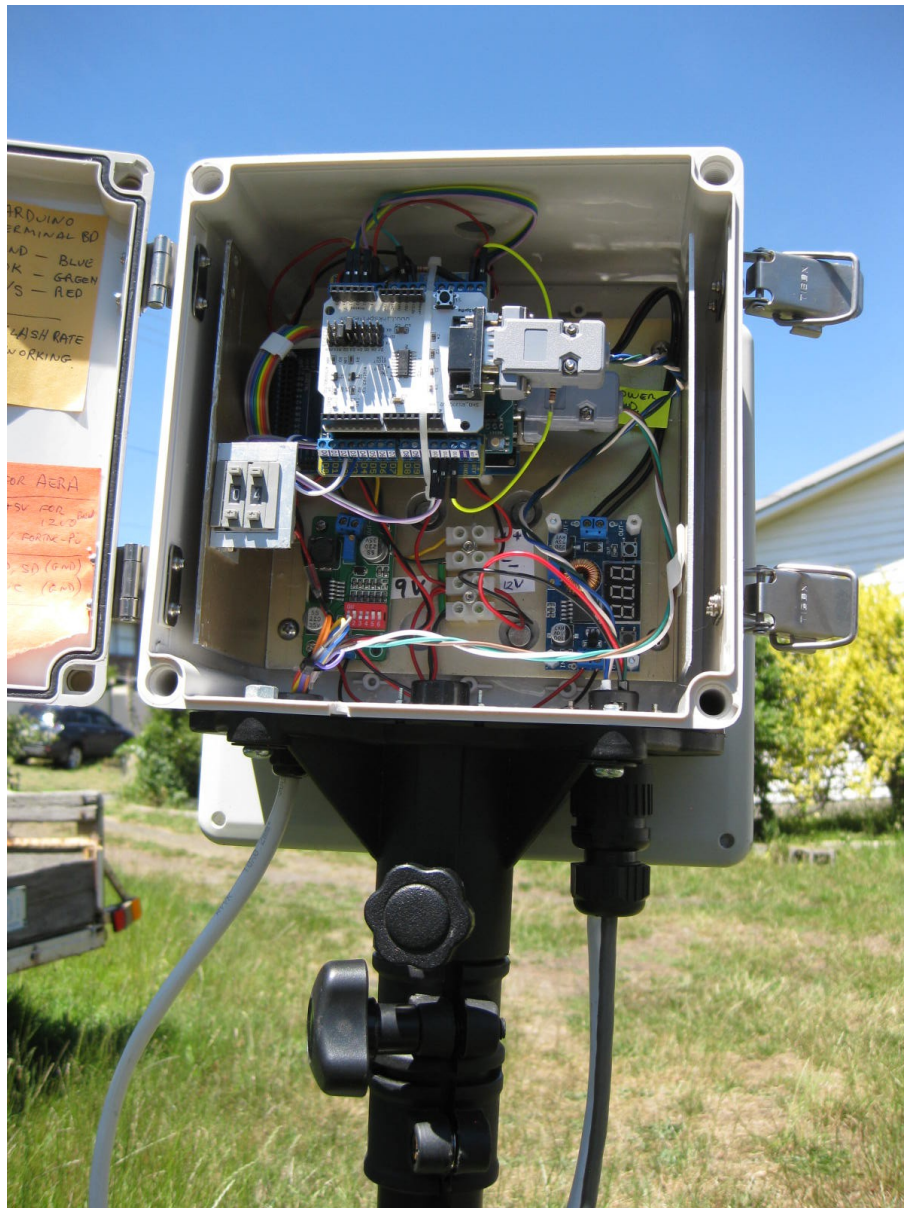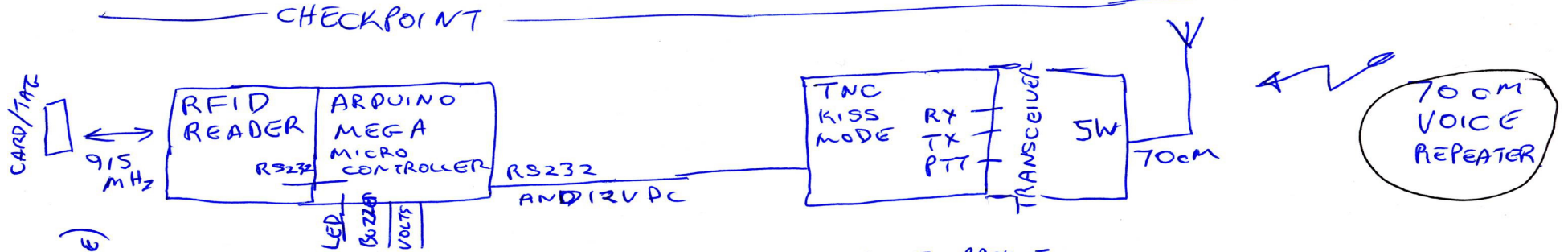
Arduino Mega as controller/interface on back of reader panel

Coastal Chipworks TNC-Pi with RS232 I/F and analog 5W handheld
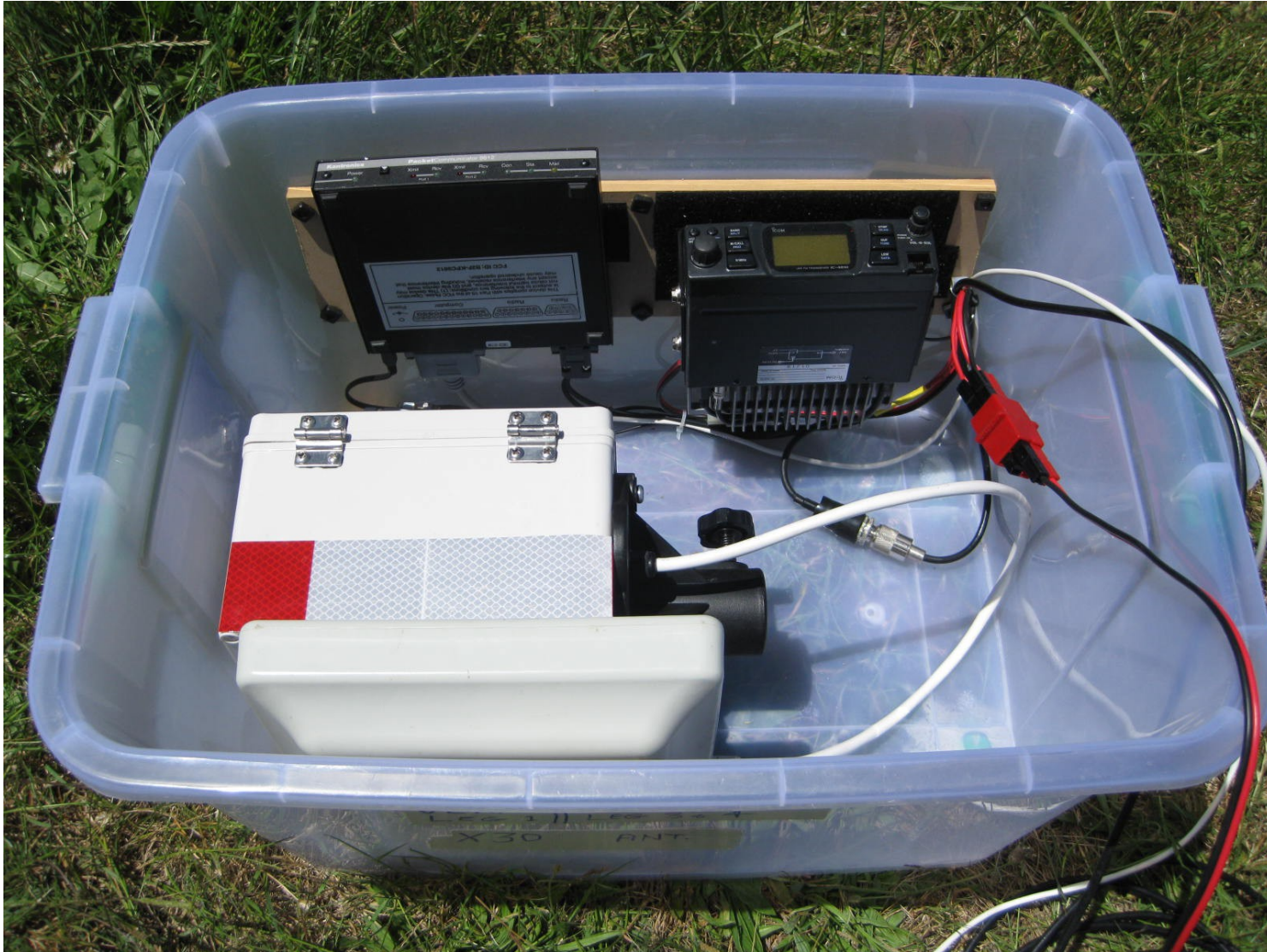
One check point reuses 1990's packet radio gear: Kantronics 9612 TNC and Icom IC-481H 70cm transceiver
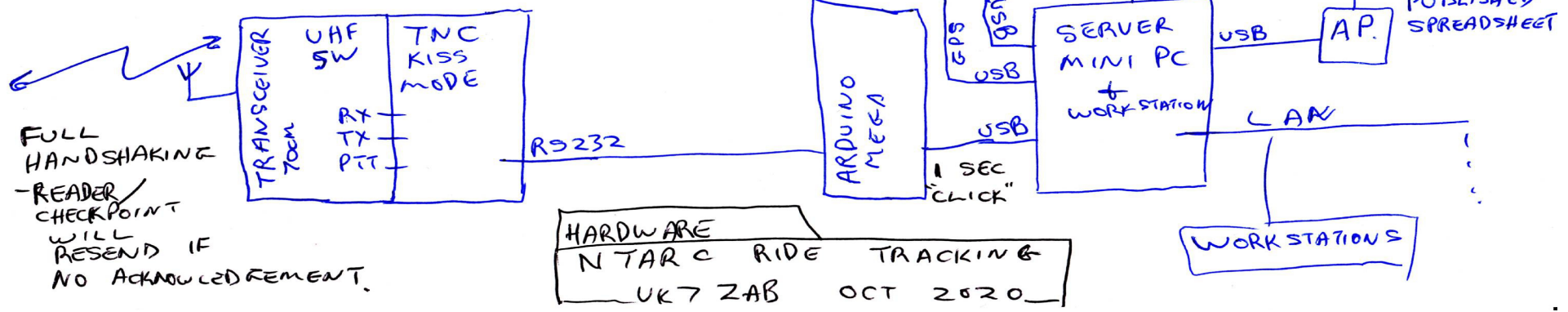
CHECKPOINT

CARD/TAG

RFID READER | ARDUINO MEGA MICRO CONTROLLER
RS232
AND 12VDC

915 MHz

LED | BUZZER | VOLTS

EPC (ELECTRONIC PRODUCT CODE) 64 BYTES

ONLY USE 7 (HEX)

16 DIGIT DECIMAL CARD NUMBER

TNC KISS MODE | RX TX PTT | TRANSCEIVER 5W

70cm

70cm VOICE REPEATER

AX.25 PACKET
- CALL SIGN TO/FROM
- 1 OR 2 CARD No.
- READER No.
- UNIX TIME STAMP(S)
    OR
1 MINUTE HEARTBEAT.

BASE

UNIX TIME WITH HEART BEAT ACKNOWLEDGE

TRANSCEIVER 70cm | UHF 5W | TNC KISS MODE
RX TX PTT
RS232

FULL HANDSHAKING
- READER / CHECKPOINT WILL RESEND IF NO ACKNOWLEDGEMENT.

ARDUINO MEGA
1 SEC "CLICK"
USB

GPS | USB

WIFI CLIENT ON AERA TRACKING SYSTEM

SERVER MINI PC + WORKSTATION
USB

LAN

A.P.

NTARC PUBLIC WEB PUBLISHED SPREADSHEET

WORKSTATIONS

HARDWARE
NTARC RIDE TRACKING
UK7 ZAB   OCT 2020

VK72AB   OCT 2020   NTARC RIDE TRACKING SOFTWARE

MINI PC — SERVER

GPS

USB

FROM ARDUINO

CHECKPOINT
CARD No.
READER No.
TIME STAMP

USB

jRFID
SOFTWARE
MODULE

UNIX TIME

DISPLAY
INCOMING
DATA

MY SQL
DATA BASE

LAN

OTHER
WORKSTATIONS
WITH
"EVENT"
SPREAD SHEAT

AERA
WI-FI

AERA BASE
TIMING
SYSTEM
— ARRIVALS
— DEPARTURE
— VET OUT

USB

WEB
PAGE
SERVER

PUBLIC
A.P.

PUBLISH

EXCEL "EVENT" SPREAD SHEET

GUI

IMPORT

MEMORY STICK   USB

AERA
"RIDE RFID USAGE"
FILE

RIDER LIST
CARD No.
LOOKUP
TABLE

REFRESH SHEET
— CHECKPOINT RIDER
— AERA IN/OUT
— VET OUT.

MANUAL SETUP &
MANUAL RIDER (CHECKPOINT)
DATA ENTRY