ibaPDA-Interface-Toshiba-ADMAP

Data Acquisition on Toshiba ADMAP-5M Bus



Manual

Issue 1.0

Measurement and Automation Systems



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1 About this manual

This manual describes the use of the software ibaPDA-Interface-Toshiba-ADMAP.

1.1 Target group

This manual addresses in particular the qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded to as professional if he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

1.2 Basic knowledge

The following basic knowledge is required to use the software ibaPDA-Interface-Toshiba-ADMAP:

- Basic knowledge of ibaPDA-V6 data acquisition system
- □ Knowledge of Toshiba's CIE control system recommended

1.3 Designations

The following designations are used in this manual:

Action	Designations
Menu command	Menu "Logic diagram"
Call of menu command	"Step 1 – Step 2 – Step 3 – Step x"
	Example:
	Select menu "Logic diagram – Add – New logic diagram"
Keys	<key name=""></key>
	Example: <alt>; <f1></f1></alt>
Press keys simultaneously	<key name=""> + <key name=""></key></key>
	Example: <alt> + <ctrl></ctrl></alt>
Buttons	<button name=""></button>
	Example: <ok>; <cancel></cancel></ok>
File names, Paths	"File name", "Path"
	Example: "Test.doc"

1.4 Used symbols

If safety instructions or other notes are used in this manual, they mean:

The non-observance of this safety information may result in an imminent risk of death or severe injury:

- By an electric shock!
- Due to the improper handling of software products which are coupled to input and output procedures with control function!

A WARNING

The non-observance of this safety information may result in a potential risk of death or severe injury!

The non-observance of this safety information may result in a potential risk of injury or material damage!



Note

A note specifies special requirements or actions to be observed.

1)

Important note

Note if some special features must be observed, for example exceptions from the rule.



Тір

Tip or example as a helpful note or insider tip to make the work a little bit easier.



Other documentation

Reference to additional documentation or further reading.

2 Introduction

2.1 Control LAN ADMAP

The control LAN ADMAP is a mainstay network of the Toshiba CIE integrated-control system, thus enabling a free communication with TOSDIC-CIE devices connected to them.

2.2 Hardware configuration

The hardware interface to the ADMAP Network is the JAMI1 board from Toshiba.

The JAMI1 board is a 32 bit PCI board of double width, full height and full length and requires two PCI slots in an IBM-PC compatible computer. Only one ADMAP card JA-MI1 can be installed per computer.

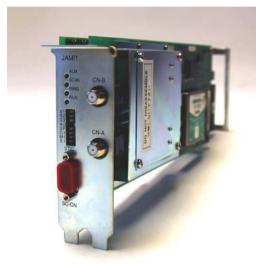


Fig. 1 Toshiba JAMI1 board

It provides a computer access to the legacy ADMAP network (ADMAP-5M bus) which is a redundant network.

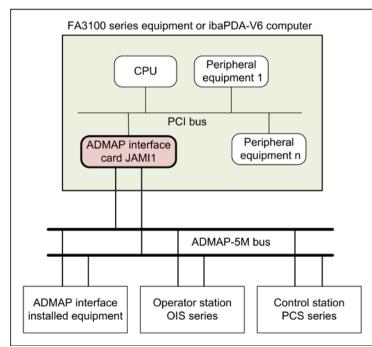


Fig. 2 Principle of ADMAP hardware configuration



2.3 Communication principle



Other documentation

This documentation covers only the parts of functionality which refer to ibaPDA-V6. For more information about the board and other subjects of the Toshiba ADMAP communication system please refer to the manufacturer's documentation, e.g.

 Integrated Control System TOSDIC-CIE ADMAP interface card JAMI1 Instruction Manual (no. 6F8C0731)

3 communication protocols are available on the Toshiba JAMI1 board.

- Scan transmission
- □ MMS transmission (not supported by ibaPDA-V6)
- LLC transmission (not supported by ibaPDA-V6)



Important note

The only protocol supported by ibaPDA-V6 is the scan transmission protocol. Furthermore, only the ADMAP-5M bus is supported by ibaPDA-V6.

Memory

The communication of the ADMAP system is based on the use of dedicated memory.

The overall memory consists of two major parts as shown in the following figure:

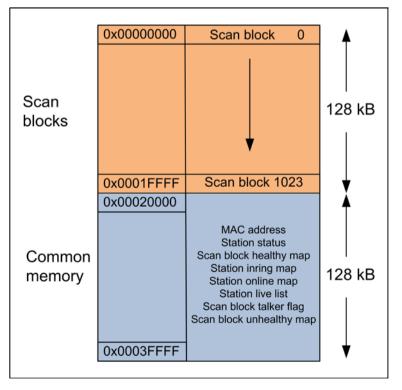


Fig. 3 Memory organization

Scan transmission protocol

The scan transmission is ADMAP's characteristic transmission mode which enables multiple devices to share the same data.

In the ADMAP card, there is a memory area called scan memory. The address range of 0x00000000 to 0x0001FFFF corresponds to 1024 blocks x 128 Byte. All the TOSDIC-CIE or compatible devices connected to the ADMAP-5M bus, have the same scan memory. When the contents of the blocks are automatically transmitted/received by the ADMAP card, all the devices hold the same memory image in the system. This means, all stations on the network see the same 128 kB of data.

To each scan block, logic Nos. 0 to 1023 is allocated. A device writing data to the bus is a so called talker. A scan block can only be written by one talker but can be read by multiple listeners. Therefore, a scan talker block is allocated to each device on the network. A scan talker block is one of the 1024 scan blocks to be transmitted by one device only for writing the data. Other devices receiving this block store the data in the same position of the scan memory as so called listeners. Hence, the data of one device can be transferred to all the other devices by just writing the data in the talker specified block.

The allocation through the entire system must grant that multiple devices will not become the talker of the same block.

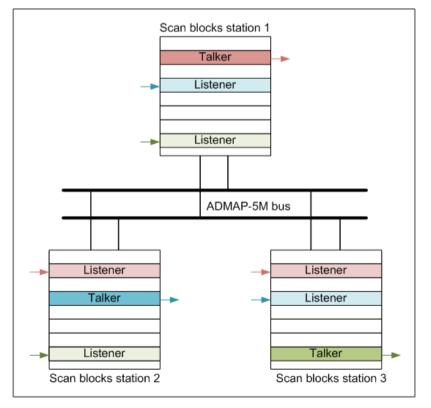


Fig. 4 Principle of scan block transmission

In terms of ibaPDA-V6 the scan block transmission is used for measurement of signals. Therefore, in ibaPDA-V6 the so called Scan block modules should be used. ibaPDA-V6 is reading data only, hence never can be a talker. There are 3 time classes defined for the blocks:

- Fast
- Medium
- □ Slow

The talker determines the update rate of the block it writes to.

While the slow and medium time classes are based on fixed and constant cycles the fast time class is rather dynamic and depends on the number of scan blocks to be transmitted in this time class. The system always tends to transmit scan blocks in the fast time class as fast as possible.

Common memory

In addition to the scan blocks for measured data transmission it is possible to access a memory range which is called "Common memory". The common memory is allocated in the address range of 0x00020000 to 0x0003FFFF and provides for system status and station information. ibaPDA-V6 uses this common memory for diagnostic purposes.

The basic structure of the common memory is shown in the table below.

Offset address	Name (number of bytes)	Chapter for more information in this manual	Chapter for detailed explanation in manu- facturer's manual
46H	MAC address of own station (6)		
4CH	Station status (2)	4.1.1	2.5.3
60H	Scan block healthy map (128)	4.1.2	2.2.4
E0H	Station in ring map (32)	4.1.3	2.5.3
100H	Station online map (32)	4.1.4	2.5.3
120H	Station live list (514)	4.1.5	2.5.3
B30H	Scan block talker flag (128)	4.1.2	2.2.4
DB0H	Scan block unhealthy map (128)	4.1.2	2.2.4

7 For more detailed information please refer to chapter 4, "Reference"

Table 1 Information in common memory

3 Configuration of ibaPDA-V6

3.1 Interface Toshiba ADMAP JAMI1

When the board is installed in the ibaPDA-V6 computer the I/O manager will show the Toshiba ADMAP JAMI1 interface. If you have a license for the board then the title area will be a blue gradient otherwise it will be a red gradient with an icon of a dongle with a red cross.

In the right pane there are 3 tabs:

- Station list
- Scan block list
- Memory view

Station list tab

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Click to add module		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
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Link 1		75	76	77	70	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
		75	/0	11	/0	75	00	01	02	03	04	00	00	0/	00	03	50	31	52	35	34	35	30	37	30	33
		100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124
							\blacksquare																			
Click to add module		125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
🖨 🕎 S7 Analyzer		150	151	152	152	154	155	156	157	158	159	160	161	162	162	164	165	166	167	168	169	170	171	172	172	174
Click to add module		150	101	132	135	134	155	130	157	150	155	100	101	102	103	104	105	100	107	100	105	170	171	1/2	175	174
TCP/IP Generic		175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
Click to add module																										
E TCP/IP VIP		200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
Click to add module		225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249
Scan block 3 (1)								201	LUL	200	201	200	200	207	200	200	210			2.10		210	210		210	210
Scan block 4 (2)		250	251	252	253	254	255																			
Scan block 52 (3)	115						_																			
Common memory (6)																										
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Fig. 5 Toshiba ADMAP JAMI1 interface, Station list tab

Labels "In ring" and "Online"

The first two labels show if the board itself is connected to the ring and if it is online. When a board is online then all data that is written to the board will be transmitted to the other stations in the ring.

When you boot the PC then the board will be automatically in online status.



□ Station array

Below you can see an array of 256 boxes. Each box represents a station on the AD-MAP network and shows the current status:

- Grey: Station is not connected
- Red: Station is connected and in stand-by mode
- Green: Station is connected and in online mode
- Thick border: Station is corresponding with JAMI1 board of ibaPDA-computer (like no. 8 in the fig. above)

Scan block list tab

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Cick to add module																					
ibaFOB-2io-D ⊕⊫ ⊫ Link 0	0		2			5	6				10	4.	12	12	14	15	16	17	18	19	~
ink 0 i∎ ⊫i⊐ Link 1	0		2	3	4	5	ь		8	9	10		12	13	14	15	16	17	18	19	
Click to add module	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
OPC Cick to add module	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	
Raw ethemet		01																			
	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	
	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	
Click to add module	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	
🖶 🕎 S7 Analyzer	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	
Click to add module	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	
Click to add module																					
TCP/IP VIP	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	
Click to add module	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	
Scan block 3 (1)	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	
Scan block 4 (2)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	
Common memory (6)																					
Click to add module	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	
$f_{\mathcal{M}}$ Virtual (0)	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	
Virtual (4)	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	
Click to add module	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	
X-Pact																					
X-Pact request Click to add module	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	~
Unmapped													1050								5
×	0	256	512		768	1024	12	80	1536	17	92 20	48	1256		OK		Арр	oly		Cancel	

Fig. 6 Toshiba ADMAP JAMI1 interface, Scan block list tab

The scan block list tab shows the scan blocks. There are 1024 boxes and each box corresponds to a scan block, showing the current status of the block.

- Grey: Scan block is unhealthy
- Red: Scan block is unhealthy while ibaPDA-V6 is measuring from that block (like no. 52 in the fig. above)
- Green: Scan block is healthy
 A scan block is healthy when there is a talker for that block, so when there is a
 station writing to that block.
- Thick border: ibaPDA-V6 is measuring from that block (like nos. 3 and 4 in the fig. above)

Memory view tab

The memory view tab shows a view of the complete memory on the board.

The first 128 kB (address 0x00000000 – 0x001FFFF) correspond to the 1024 scan blocks.

The second 128 kB (address 0x00020000 – 0x0003FFFF) correspond to the common memory area. This area contains diagnostic information like the scan block healthy list.

Please refer to chapter 4, "Reference" or to the manufacturer's instruction manual to find out the exact meaning of each byte in the common memory area.

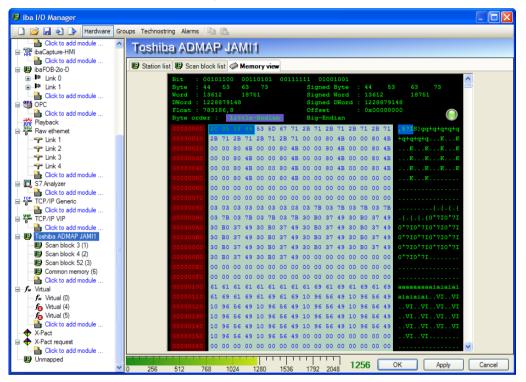


Fig. 7 Toshiba ADMAP JAMI1 interface, Memory view tab

3.2 Modules

There are 2 types of modules you can add to the Toshiba ADMAP JAMI1 interface:

- □ Scan block module
- Common memory module.

3.2.1 Scan block module

The scan block module is able to measure the 128 bytes of a scan block. Therefore, a scan block module should be used to measure process data and signals.

One scan block per module is allowed, i. e. at least one scan block module is required for each scan block to be measured. Otherwise, multiple scan block modules can refer to the same scan block.

"General" tab

On the "General" tab you have to specify the scan block number (0 - 1023) of the block you'd like to measure

You can also specify the swap mode and the number of signals.

The module time base should be set equal or faster than the time class the talker uses to write on this block. See configuration of talker to find out the time class.

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Cick to add module	Scan block 3 (1	·		
i link 0	⊡ Basic			
	Locked	False		
Click to add module	Enabled	True		
DPC	Name	Scan block 3		
Click to add module	Module No.	1		
Playback	Timebase	1 ms		
	Advanced			
	Swap Mode	No swap		
	🗆 JAMI			
	Scan block	3		
Link 4	Module Layout			
Click to add module	No. analog signals	32		
🖃 📆 S7 Analyzer	No. digital signals	32		
Click to add module				
Click to add module				
TCP/IP VIP				
Click to add module				
Click to add module				
Scan block 3 (1)				
Scan block 3 (1)				
Common memory (6)				
Click to add module	Name The name of the module			
	The name of the module.			
fx Virtual (0)				
Virtual (4)				
Virtual (5)				
Click to add module				
A-Pact				
- X-Pact request				
Click to add module				
III Unmapped				
	0 256 512 768	1024 1280 1536 1792	92 2048 1256 ОК Арріу	Cancel

Fig. 8 Scan block module, General tab

"Analog" tab

For an analog signal you have to specify the address (hex or decimal) relative to the start address of the scan talker block (0 to 127) and the data type. The Actual column shows the current value of the signal. By clicking on the Actual column header you can switch between raw and scaled view of the value.

By clicking on the Address column header you can let ibaPDA-V6 calculate the addresses based on the data type of the signals.

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Click to add module	Scan	block 3 (1)									
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in link 0	Name			Unit	Gain	Offset	Address	DataType	Active	Actual +	^
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Click to add module	1				1	. 0	0x1	BYTE		145	
🖻 🦥 OPC	2				1	0	0x2	BYTE		145	
Click to add module	3				1			BYTE		145	
Playback	4					-		BYTE		145	
P Link 1					-	-					
🖓 Link 2	5				1			BYTE		145	
	6				1	. 0	0x6	BYTE		145	
	7				1	. 0	0x7	BYTE		145	
Click to add module	8				1	. 0	0x8	INT	 Image: A start of the start of	27281	
Click to add module	9				1	. 0	0xA	INT		27281	
TCP/IP Generic	10				1	0	0xC	INT		27281	
Click to add module	11				1	0	0.45	INT		27281	
🖃 👺 TCP/IP VIP	12					-	0x10			27281	
Click to add module					1						
Toshiba ADMAP JAMI1 Scan block 3 (1)	13				1	-	0x12			27281	
Scan block 3 (1)	14				1	. 0	0x14	INT		27281	
Scan block 52 (3)	15				1	. 0	0x16	INT		27281	
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Fig. 9 Scan block module, Analog tab

"Digital" tab

For a digital signal you have to specify the address (hex or decimal) relative to the start address of the scan talker block (0 to 127) and the bit number. The bit number goes from 0 to 31.

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Click to add module	Scan block 3 (1)				
🖶 🔢 ibaFOB-2io-D	🔢 General 🔨 Analog 👖 Digital				
🗈 🛤 Link 0	Name	Address	Bit no.		Actual 💠 📩
Link 1 Click to add module	0	0x0	-		1
Click to add module	1	0x0	1	X	0
Click to add module	2	0x0	2		0
Playback Raw ethemet	3	0x0	3	V	0
	4	0x0	4	~	1
¶ar Link 1 ¶ar Link 2	5	0x0	5	V	0
	6	0x0	6		0
	7	0x0	7		1
Click to add module	8	0x0	8		1
S7 Analyzer	9				
Click to add module		0x0	9		0
Click to add module	10	0x0	10		0
	11	0x0	11	V	0
Click to add module	12	0x0	12		1
Toshiba ADMAP JAMI1	13	0x0	13	V	0
Scan block 3 (1)	14	0x0	14	V	0
Scan block 4 (2) Scan block 52 (3)	15	0x0	15		1
- ID Common memory (6)	16	0x0	16		1
Click to add module	17	0x0	17		0
🗐 🎜 Virtual	18	0x0	18		0
🚽 🎜 Virtual (0)	19				-
- fo Virtual (4) - fo Virtual (5)		0x0	19		0
Click to add module	20	0x0	20	V	1
X-Pact	21	0x0	21	X	0
X-Pact request	22	0x0	22	V	0
Click to add module	23	0x0	23	V	1 ~
Unmapped	0 256 512 768 1024 1280 1536 1792 2048 1256	ОК	Apply		Cancel

Fig. 10 Scan block module, Digital tab



3.2.2 Common memory module

The common memory module is able to measure the 128 kB of common memory. It can be used to acquire station information data in order to store it in a data file or for example to use it for display on an ibaQPanel client.

On the "General" tab you can specify the swap mode and the number of signals.

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Fig. 11 Common memory module, General tab

"Analog" and "Digital" tabs

The analog and digital signals are configured in the same way like for the scan modules. Only the addresses to be specified here are relative to the start address of the common memory (0 to 128 kB).

For the offsets of the different maps in the common memory please refer to Table 1 "Information in common memory" at the end of chapter 2.3.

4 Reference

In the following you'll find some excerpts of the ADMAP Interface instruction manual (no. 6F8C0732, 1997), showing the allocation of station information in the common memory. You may refer to the offset addresses when using the memory view function in ibaPDA-V6 I/O manager.

4.1.1 Station Status

ADMAP-5M holds information to express the status of own station and information to express the status of other stations.

The format for the station status retained in the ADMAP-5M card is shown below.

	15	14	13	12	11	1	0
Γ	_	SC	—	—	OL	STATUS	—

 SC :
 during scan transmission

 OL :
 online

 STATUS :
 station status

 0000000000 :
 PowerOn
 0000000001 :

 0000000010 :
 OffRing
 0000000100 :

 0000001000 :
 InRing
 0000010000 :

 000010000 :
 Disconnect
 000100000 :

 001000000 :
 Test
 010000000 :

 100000000 :
 Down

4.1.2 Scan information map

As the map related to scan transmission, there exist three types of map:

- Scan healthy map
- □ Scan unhealthy map
- Scan talker flag

The scan healthy map indicates the present receiving condition using one bit per block. A healthy block is expressed by 1 and an unhealthy block by 0.

The scan unhealthy map is different in that 1 is set for the bit of a block judged healthy once and becomes unhealthy and 0 for others which is held until the application program clears.

All the maps are structured in the same way and provided in the form shown like hereafter.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+00H	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+02H	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
+7EH	1023	1022	1021	1020	1019	1018	1017	1016	1015	1014	1013	1012	1011	1010	1009	1008

All the scan healthy map, scan unhealthy map, and scan talker flag are allocated one bit each from block 0.

4.1.3 Station inring map

The station inring map is a bit map to express IN/OFF status as to the logical ring for all the stations of the system. The following shows the types.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+00h	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+02h	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
+1eh	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

In the ascending sequence of the MAC address least significant bytes, the participation of the station in the logical ring is indicated by 1 and no participation by 0.

4.1.4 Online map

Bit map to express online/standby for all the stations in the system. The following shows the types.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+00h	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+02h	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
+1eh	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
-	_	30 254			27 251						21 245	-				17 241

In the ascending sequence of MAC address least significant bytes, the online status of the

station is indicated by 1 and the standby status or OffRing status by 0.

4.1.5 Live list

The live list is a list to store the status for all the stations in the system. The list varies with each ADMAP card.

The following diagram shows the format for the ADMAP-5M live list.

	15	0
+00h	Not used	EN

In the offset 0 or 5, the status flag is stored. EN indicates the completion of the list. 1 indicates the completion of data creation for all the stations.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
+02h	Not	used					Bnc	Anc	Ber	Aer	ncB	ncA	OL	RX	EN	RG	STN 1
+04h	Not	used					Bnc	Anc	Ber	Aer	ncB	ncA	OL	RX	EN	RG	STN 2
+100h	Not	used					Bnc	Anc	Ber	Aer	ncB	ncA	OL	RX	EN	RG	STN255

From the offset 2, the status of each station is stored in 16 bits, in the ascending order of the MAC address least significant bytes.

RG: 1 : participating in ring

EN: 1: information of relevant station is effective

The following status can be judged by combining RG and EN.

- EN RG
- 0 0 existence not checked
- 0 1 not used
- 1 1 status of participation in ring
- 1 0 status of removal from ring
- OL:1:online
- ncA : medium A without carrier
- ncB: medium B without carrier
- Aer : medium A diagnosis abnormal
- Ber : medium B diagnosis abnormal
- Anc : medium A NCD abnormal
- Bnc: medium B NCD abnormal

5

Support and Contact

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Note

If you require support, specify the serial number (iba-S/N) of the product.

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