ProLinx COMMUNICATION GATEWAYS

GRCM

GRCM Driver

GRC GARECO Check Weigher Module

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Document Revision History

Revision	Description	Date
01	First public release	7/11/03

Related Documents & Reference Materials

Several resources are available to assist with the configuration and support of the ProLinx Communication Gateways, Inc. modules. The following files are available off the ftp site:

Startup Guide	ftp://ftp.prosoft-technology.com/pub/prolinx/Protocol_Manuals/	
	Startup_guide_2.20.pdf	ProLinx Communication Gateways, Inc. Startup Guide

1 Introduction

The GRCM driver permits the ProLinx Communication Gateways, Inc. module to interface GARECO Check Weigher using Remote Control Instruction to the many protocols and networks available. The driver supports one to four ports that provide accessibility from one to four independent serial networks.

1.1 General Specifications

- **Ports:** One to four ports to receive and/or transmit data
- **Receive buffer size**: 255 bytes
- **Receive termination:** Termination character
- **Receive database location:** 0 to 7000
- **Communication Configuration**
  - **Baud Rate:** 300 to 115,200
  - **Parity:** None, Odd, Even
  - **Data Bits:** 5 to 8
  - **Stop Bits:** 1 or 2
  - **RTS On and Off Timing:** 0 to 65535 milliseconds
  - **Minimum Response Delay:** 0 to 65535 milliseconds
  - **Hardware Handshaking:** RTS/CTS

Supports device types of Topline VS/VO, “S” Series, and “E” Series

1.2 Resources

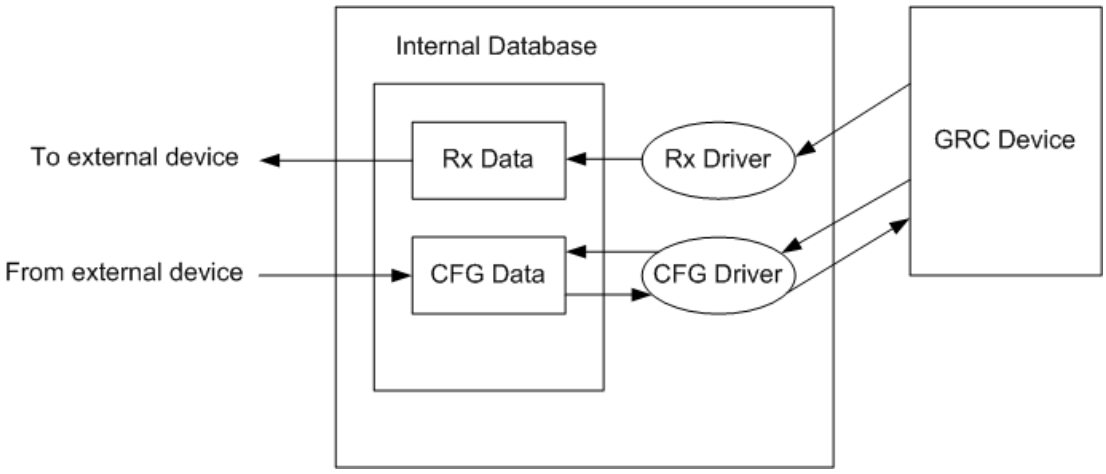
The *ProLinx Communication Gateways, Inc. Startup Guide* provides general information on all ProLinx modules including installation, editing configuration files, cabling and jumper configurations, troubleshooting, and a wide range of useful information. You should have this manual available when installing and configuring ProLinx modules.

2 Functionality

This section describes the functionality of the GRCM driver.

2.1 Data Flow

The following diagram displays receive and transmit dataflow of the GRCM driver.



Data received from the GRC device is accepted by the receive driver and placed in the receive database location. The receive driver starts saving the characters when a character is received. The receive driver waits until a termination character is recognized while receiving the data before placing the new data into the database.

The LF character is used as the termination condition for a received message. This signals the end of the message. When the receive driver observes this character in the input stream, it takes all received characters, processes them, and places them in the internal database according to the command and parameters types returned.

The data flow for configuration data from an external device to the GRC device is also shown in the previous diagram. When the configuration driver is triggered, it copies the data in the internal database into the transmit buffer and sends the new data to the GRC device.

2.2 GRCM Database Map

Data transmitted to and from GRC device is placed in a fixed location in the module's internal database. The following table and section show where and how GRC module's internal database looks like:

Port No.	Toggle Command (0 or 1)	Assign ID for RS-485 (0=no id included)	Article Name (keyword "CURRENT" for current article)	Command Count	Command Number (MAX 99 commands)	Start Parameter	Start Response Value
Port 1	0	2	4 to 9	100	101 to 199	1000	2300
Port 2	10	12	14 to 19	200	201 to 299	1300	3300
Port 3	20	22	24 to 29	300	301 to 399	1600	4300
Port 4	30	32	34 to 39	400	401 to 499	1900	5300

2.2.1 Sending Data

Each command transmitted to GRC devices can dynamically be set up. The following table shows each individual location for each command's parameter according to database address map:

DB	0	1	2	3	4	5	6	7	8	9
0	FB_SENDEN inquire specific data block (INT)		FB_SET_TOLSYST production legislation (INT)		FB_SET_PGS Plus to Good (INT)		FB_SET_PAUSE Delay (INT)		FB_SET_AUTO HOUR Automatic sending production hour (INT)	
10	FB_SET_DATE 1 Day (INT)	FB_SET_DATE 2 Month (INT)	FB_SET_DATE 3 Year (INT)		FB_SET_TIME 1 Hour (INT)	FB_SET_TIME 2 Minute (INT)		FB_SET_HS 1 Handshake Protocol (INT)	FB_SET_HS 2 Handshake Protocol (INT)	

DB	0	1	2	3	4	5	6	7	8	9
20	FB_PD 1 (Two CHAR Byte)	FB_PD 2 (Two CHAR Byte)	FB_PD 3 (Two CHAR Byte)	FB_PD 4 (Two CHAR Byte)	FB_PD 5 (Two CHAR Byte)					
30	FB_GRUND 1 version number (Two CHAR Byte)	FB_GRUND 2 version number (Two CHAR Byte)	FB_GRUND 3 version number (Two CHAR Byte)		FB_GRUND 1 article name (Two CHAR Byte)	FB_GRUND 2 article name (Two CHAR Byte)	FB_GRUND 3 article name (Two CHAR Byte)	FB_GRUND 4 article name (Two CHAR Byte)	FB_GRUND 5 article name (Two CHAR Byte)	
40	FB_GRUND 1 article name (Two CHAR Byte)	FB_GRUND 2 article name (Two CHAR Byte)	FB_GRUND 3 article name (Two CHAR Byte)	FB_GRUND 4 article name (Two CHAR Byte)	FB_GRUND 5 article name (Two CHAR Byte)	FB_GRUND 6 article name (Two CHAR Byte)	FB_GRUND 7 article name (Two CHAR Byte)		FB_GRUND weight unit (INT)	
50	FB_DATA 1 nominal weight (Float)	FB_DATA 2 nominal weight (Float)			FB_DATA 1 mean fixed tare (Float)	FB_DATA 2 mean fixed tare (Float)		FB_DATA product length (INT)		FB_DATA successive errors number (INT)
60	FB_DATA target throughput (INT)		FB_DATA measuring time (INT)		FB_DATA 1 correction factor (Float)	FB_DATA 2 correction factor (Float)		FB_DATA max length (INT)		
70	FB_DATA 1 block termination (Float)	FB_DATA 2 block termination (Float)								
80	FB_GRENZEN 1 limit PLUS 3 (Float)	FB_GRENZEN 2 limit PLUS 3 (Float)			FB_GRENZEN 1 limit PLUS 2 (Float)	FB_GRENZEN 2 limit PLUS 2 (Float)			FB_GRENZEN 1 limit PLUS 1 (Float)	FB_GRENZEN 2 limit PLUS 1 (Float)
90	FB_GRENZEN 1 limit MINUS 1 (Float)	FB_GRENZEN 2 limit MINUS 1 (Float)			FB_GRENZEN 1 limit MINUS 2 (Float)	FB_GRENZEN 2 limit MINUS 2 (Float)			FB_GRENZEN 1 limit MINUS 3 (Float)	FB_GRENZEN 2 limit MINUS 3 (Float)
100	FB_STAT 1 batch number (Two CHAR Byte)	FB_STAT 2 batch number (Two CHAR Byte)	FB_STAT 3 batch number (Two CHAR Byte)	FB_STAT 4 batch number (Two CHAR Byte)	FB_STAT 5 batch number (Two CHAR Byte)		FB_STAT 1 tolerance limit TO 2 (Float)	FB_STAT 2 tolerance limit TO 2 (Float)		
110	FB_STAT 1 tolerance limit TO 1 (Float)	FB_STAT 2 tolerance limit TO 1 (Float)			FB_STAT 1 tolerance limit TU 1 (Float)	FB_STAT 2 tolerance limit TU 1 (Float)			FB_STAT 1 tolerance limit TU 2 (Float)	FB_STAT 2 tolerance limit TU 2 (Float)
120	FB_STAT tolerance system (INT)		FB_STAT TU 1 percentage (INT)		FB_STAT type of interval (INT)		FB_STAT scope of one interval (INT)		FB_STAT block termination (INT)	

DB	0	1	2	3	4	5	6	7	8	9
130	FB_TR 1 tolerance+ (Float)	FB_TR 2 tolerance+ (Float)			FB_TR 1 tolerance- (Float)	FB_TR 2 tolerance- (Float)			FB_TR 1 high limit (Float)	FB_TR 2 high limit (Float)
140	FB_TR 1 low limit (Float)	FB_TR 2 low limit (Float)			FB_TR 1 overfill (Float)	FB_TR 2 overfill (Float)		FB_TR no. of pcs (INT)		FB_TR neutral distance (INT)
150	FB_TR start phase (INT)		FB_TR start vaule (INT)		FB_TR 1 control factor (Float)	FB_TR 2 control factor (Float)		FB_TR feedback controlling on/off (INT)		
160	FB_GLEIT 1 reference weight (Float)	FB_GLEIT 2 reference weight (Float)			FB_GLEIT 1 high limit (Float)	FB_GLEIT 2 high limit (Float)			FB_GLEIT 1 T1+ limit (Float)	FB_GLEIT 2 T1+ limit (Float)
170	FB_GLEIT 1 T1- limit (Float)	FB_GLEIT 2 T1- limit (Float)			FB_GLEIT 1 low limit (Float)	FB_GLEIT 2 low limit (Float)		FB_GLEIT gliding limits (INT)		
180	FB_FKT number of cycle (INT)		FB_FKT neutral distance (INT)		FB_FKT 1 high limit (Float)	FB_FKT 2 high limit (Float)			FB_FKT 1 low limit (Float)	FB_FKT 2 low limit (Float)
190	FB_FKT automatic printing (INT)		FB_FKT fill head test (INT)							
200	FB_MWG number of pcs for mean value (INT)		FB_MWG 1 high limit (Float)	FB_MWG 2 high limit (Float)			FB_MWG 1 low limit (Float)	FB_MWG 2 low limit (Float)		FB_MWG monitoring (INT)
210	FB_METALL product memory No. (INT)		FB_METALL sensitivity (INT)		FB_METALL block termination (INT)					

2.2.2 Receiving Data

Whenever requesting data from GRC devices, received data will also be stored on to module database area. The following table shows how those values are setup according to database address map:

DB	0	1	2	3	4	5	6	7	8	9

DB	0	1	2	3	4	5	6	7	8	9
0	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1	Article Name 1
10	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2	Article Name 2
20	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3	Article Name 3
30	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4	Article Name 4
40	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5	Article Name 5
50	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6	Article Name 6
60	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7	Article Name 7
70	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8	Article Name 8
80	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9	Article Name 9
90	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10	Article Name 10
100	Weigher Number	Weigher Number	Weigher Number	Weigher Number	Weigher Number	Weigher Number	Weigher Number	Weigher Number	Weigher Number	
110	Identity Letter of program option	Identity Letter of program option	Identity Letter of program option	Identity Letter of program option	Identity Letter of program option	Identity Letter of program option				
120	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article	Latest Deleted Article
130	Hourly Records - current number		Hourly Records - time of begin 1	Hourly Records - time of begin 2	Hourly Records - time of begin 3		Hourly Records - date of begin 1	Hourly Records - date of begin 2	Hourly Records - date of begin 3	Hourly Records - date of begin 4
140	Hourly Records - time of end 1	Hourly Records - time of end 2	Hourly Records - time of end 3		Hourly Records - date of end 1	Hourly Records - date of end 2	Hourly Records - date of end 3	Hourly Records - date of end 4		

DB	0	1	2	3	4	5	6	7	8	9
150	Hourly Records - throughput 1	Hourly Records - throughput 2			Hourly Records - mean value 1	Hourly Records - mean value 2			Hourly Records - TU1% 1	Hourly Records - TU1% 2
160	Filling Heads - current number		Filling Heads - mean value 1	Filling Heads - mean value 2			Filling Heads - standard deviation 1	Filling Heads - standard deviation 2		
170	Filling Heads - minimum 1	Filling Heads - minimum 2			Filling Heads - maximum 1	Filling Heads - maximum 2				
180	FB_LADEN Command Upload Status Command 1	FB_LADEN Command Upload Status Command 2	FB_LADEN Command Upload Status Command 3	FB_LADEN Command Upload Status Command 4	FB_LADEN Command Upload Status Command 5	FB_LADEN Command Upload Status Command 6	FB_LADEN Command Upload Status Command 7	FB_LADEN Command Upload Status Command 8	FB_LADEN Command Upload Status Command 9	
190	FB_Load_Started number 1	FB_Load_Started number 1								
200	FBQU_GRUND response param 1	FBQU_GRUND response param 2	FBQU_GRUND response param 3	FBQU_GRUND response param 4						
210	FBQU_DATA response param 1	FBQU_DATA response param 2	FBQU_DATA response param 3	FBQU_DATA response param 4	FBQU_DATA response param 5	FBQU_DATA response param 6	FBQU_DATA response param 7	FBQU_DATA response param 8	FBQU_DATA response param 9	
220	FBQU_GRENZEN response param 1	FBQU_GRENZEN response param 2	FBQU_GRENZEN response param 3	FBQU_GRENZEN response param 4	FBQU_GRENZEN response param 5	FBQU_GRENZEN response param 6				
230	FBQU_STAT response param 1	FBQU_STAT response param 2	FBQU_STAT response param 3	FBQU_STAT response param 4	FBQU_STAT response param 5	FBQU_STAT response param 6	FBQU_STAT response param 7	FBQU_STAT response param 8	FBQU_STAT response param 9	FBQU_STAT response param 10
240	FBQU_TR response param 1	FBQU_TR response param 2	FBQU_TR response param 3	FBQU_TR response param 4	FBQU_TR response param 5	FBQU_TR response param 6	FBQU_TR response param 7	FBQU_TR response param 8	FBQU_TR response param 9	FBQU_TR response param 10
250	FBQU_TR response param 11									
260	FBQU_GLEIT response param 1	FBQU_GLEIT response param 2	FBQU_GLEIT response param 3	FBQU_GLEIT response param 4	FBQU_GLEIT response param 5	FBQU_GLEIT response param 6				
270	FBQU_FKT response param 1	FBQU_FKT response param 2	FBQU_FKT response param 3	FBQU_FKT response param 4	FBQU_FKT response param 5	FBQU_FKT response param 6				
280	FBQU_MWG response param 1	FBQU_MWG response param 2	FBQU_MWG response param 3	FBQU_MWG response param 4						
290	FBQU_METALL response param 1	FBQU_METALL response param 2	FBQU_METALL response param 3							

DB	0	1	2	3	4	5	6	7	8	9
300	FB_GRUND response value 1	FB_GRUND response value 1	FB_GRUND response value 1		FB_GRUND response value 2	FB_GRUND response value 2	FB_GRUND response value 2	FB_GRUND response value 2	FB_GRUND response value 2	
310	FB_GRUND response value 3	FB_GRUND response value 3	FB_GRUND response value 3	FB_GRUND response value 3	FB_GRUND response value 3	FB_GRUND response value 3	FB_GRUND response value 3		FB_GRUND response value 4	
320	FB_DATA response value 1	FB_DATA response value 1			FB_DATA response value 2	FB_DATA response value 2		FB_DATA response value 3		FB_DATA response value 4
330	FB_DATA response value 5		FB_DATA response value 6		FB_DATA response value 7	FB_DATA response value 7		FB_DATA response value 8		
340	FB_DATA response value 9	FB_DATA response value 9								
350	FB_GRENZEN response value 1	FB_GRENZEN response value 1			FB_GRENZEN response value 2	FB_GRENZEN response value 2			FB_GRENZEN response value 3	FB_GRENZEN response value 3
360	FB_GRENZEN response value 4	FB_GRENZEN response value 4			FB_GRENZEN response value 5	FB_GRENZEN response value 5			FB_GRENZEN response value 6	FB_GRENZEN response value 6
370	FB_STAT response value 1	FB_STAT response value 1	FB_STAT response value 1	FB_STAT response value 1	FB_STAT response value 1		FB_STAT response value 2	FB_STAT response value 2		
380	FB_STAT response value 3	FB_STAT response value 3			FB_STAT response value 4	FB_STAT response value 4			FB_STAT response value 5	FB_STAT response value 5
390	FB_STAT response value 6		FB_STAT response value 7		FB_STAT response value 8		FB_STAT response value 9		FB_STAT response value 10	
400	FB_TR response value 1	FB_TR response value 1			FB_TR response value 2	FB_TR response value 2			FB_TR response value 3	FB_TR response value 3
410	FB_TR response value 4	FB_TR response value 4			FB_TR response value 5	FB_TR response value 5		FB_TR response value 6		FB_TR response value 7
420	FB_TR response value 8		FB_TR response value 9		FB_TR response value 10	FB_TR response value 10		FB_TR response value 11		
430	FB_GLEIT response value 1	FB_GLEIT response value 1			FB_GLEIT response value 2	FB_GLEIT response value 2			FB_GLEIT response value 3	FB_GLEIT response value 3

DB	0	1	2	3	4	5	6	7	8	9
440	FB_GLEIT response value 4	FB_GLEIT response value 4			FB_GLEIT response value 5	FB_GLEIT response value 5		FB_GLEIT response value 6		
450	FB_FKT response value 1		FB_FKT response value 2		FB_FKT response value 3	FB_FKT response value 3			FB_FKT response value 4	FB_FKT response value 4
460	FB_FKT response value 5		FB_FKT response value 6							
470	FB_MWG response value 1		FB_MWG response value 2	FB_MWG response value 2			FB_MWG response value 3	FB_MWG response value 3		FB_MWG response value 4
480	FB_METALL response value 1		FB_METALL response value 2		FB_METALL response value 3					
490	FB_PD_PLUS response value 1	FB_PD_PLUS response value 1			FB_PD_PLUS response value 2	FB_PD_PLUS response value 2			FB_PD_PLUS response value 3	FB_PD_PLUS response value 3
500	FB_PD_PLUS response value 4	FB_PD_PLUS response value 4			FB_PD_PLUS response value 5	FB_PD_PLUS response value 5			FB_PD_PLUS response value 6	FB_PD_PLUS response value 6
510	FB_PD_PLUS response value 7	FB_PD_PLUS response value 7			FB_PD_PLUS response value 8	FB_PD_PLUS response value 8			FB_PD_PLUS response value 9	FB_PD_PLUS response value 9
520	FB_PD_GUT response value 1	FB_PD_GUT response value 1			FB_PD_GUT response value 2	FB_PD_GUT response value 2			FB_PD_GUT response value 3	FB_PD_GUT response value 3
530	FB_PD_GUT response value 4	FB_PD_GUT response value 4			FB_PD_GUT response value 5	FB_PD_GUT response value 5				
540	FB_PD_MINUS response value 1	FB_PD_MINUS response value 1			FB_PD_MINUS response value 2	FB_PD_MINUS response value 2			FB_PD_MINUS response value 3	FB_PD_MINUS response value 3
550	FB_PD_MINUS response value 4	FB_PD_MINUS response value 4			FB_PD_MINUS response value 5	FB_PD_MINUS response value 5			FB_PD_MINUS response value 6	FB_PD_MINUS response value 6
560	FB_PD_MINUS response value 7	FB_PD_MINUS response value 7			FB_PD_MINUS response value 8	FB_PD_MINUS response value 8			FB_PD_MINUS response value 9	FB_PD_MINUS response value 9
570	FB_PD_STAT response value 1	FB_PD_STAT response value 1	FB_PD_STAT response value 1	FB_PD_STAT response value 1	FB_PD_STAT response value 1		FB_PD_STAT response value 2	FB_PD_STAT response value 2	FB_PD_STAT response value 2	
580	FB_PD_STAT response value 3	FB_PD_STAT response value 3	FB_PD_STAT response value 3	FB_PD_STAT response value 3	FB_PD_STAT response value 3					

DB	0	1	2	3	4	5	6	7	8	9
590	FB_PD_STAT response value 4	FB_PD_STAT response value 4	FB_PD_STAT response value 4	FB_PD_STAT response value 4	FB_PD_STAT response value 4					
600	FB_PD_STAT response value 5	FB_PD_STAT response value 5			FB_PD_STAT response value 6	FB_PD_STAT response value 6			FB_PD_STAT response value 7	FB_PD_STAT response value 7
610	FB_PD_STAT response value 8	FB_PD_STAT response value 8			FB_PD_STAT response value 9	FB_PD_STAT response value 9			FB_PD_STAT response value 10	FB_PD_STAT response value 10
620	FB_PD_STAT response value 11	FB_PD_STAT response value 11			FB_PD_STAT response value 12	FB_PD_STAT response value 12			FB_PD_STAT response value 13	FB_PD_STAT response value 13
630	FB_PD_STAT response value 14	FB_PD_STAT response value 14			FB_PD_STAT response value 15	FB_PD_STAT response value 15				
640	FB_PD_AKTINT response value 1	FB_PD_AKTINT response value 1	FB_PD_AKTINT response value 1	FB_PD_AKTINT response value 1	FB_PD_AKTINT response value 1		FB_PD_AKTINT response value 2	FB_PD_AKTINT response value 2	FB_PD_AKTINT response value 2	
650	FB_PD_AKTINT response value 3	FB_PD_AKTINT response value 3			FB_PD_AKTINT response value 4	FB_PD_AKTINT response value 4			FB_PD_AKTINT response value 5	FB_PD_AKTINT response value 5
660	FB_PD_AKTINT response value 6	FB_PD_AKTINT response value 6			FB_PD_AKTINT response value 7	FB_PD_AKTINT response value 7			FB_PD_AKTINT response value 8	FB_PD_AKTINT response value 8
670	FB_PD_AKTINT response value 9	FB_PD_AKTINT response value 9			FB_PD_AKTINT response value 10	FB_PD_AKTINT response value 10			FB_PD_AKTINT response value 11	FB_PD_AKTINT response value 11
680	FB_PD_LASTINT response value 1	FB_PD_LASTINT response value 1	FB_PD_LASTINT response value 1	FB_PD_LASTINT response value 1	FB_PD_LASTINT response value 1		FB_PD_LASTINT response value 2	FB_PD_LASTINT response value 2	FB_PD_LASTINT response value 2	
690	FB_PD_LASTINT response value 3	FB_PD_LASTINT response value 3			FB_PD_LASTINT response value 4	FB_PD_LASTINT response value 4			FB_PD_LASTINT response value 5	FB_PD_LASTINT response value 5
700	FB_PD_LASTINT response value 6	FB_PD_LASTINT response value 6			FB_PD_LASTINT response value 7	FB_PD_LASTINT response value 7			FB_PD_LASTINT response value 8	FB_PD_LASTINT response value 8
710	FB_PD_LASTINT response value 9	FB_PD_LASTINT response value 9			FB_PD_LASTINT response value 10	FB_PD_LASTINT response value 10			FB_PD_LASTINT response value 11	FB_PD_LASTINT response value 11
720	FB_PD_14 response value 1	FB_PD_14 response value 1			FB_PD_14 response value 2	FB_PD_14 response value 2			FB_PD_14 response value 3	FB_PD_14 response value 3
730	FB_PD_14 response value 4	FB_PD_14 response value 4			FB_PD_14 response value 5	FB_PD_14 response value 5			FB_PD_14 response value 6	FB_PD_14 response value 6

DB	0	1	2	3	4	5	6	7	8	9
740	FB_PD_14 response value 7	FB_PD_14 response value 7			FB_PD_14 response value 8	FB_PD_14 response value 8			FB_PD_14 response value 9	FB_PD_14 response value 9
750	FB_PD_14 response value 10	FB_PD_14 response value 10			FB_PD_14 response value 11	FB_PD_14 response value 11			FB_PD_14 response value 12	FB_PD_14 response value 12
760	FB_PD_14 response value 13	FB_PD_14 response value 13			FB_PD_14 response value 14	FB_PD_14 response value 14				
770	FB_PD_CHARGE response value 1	FB_PD_CHARGE response value 1	FB_PD_CHARGE response value 1	FB_PD_CHARGE response value 1	FB_PD_CHARGE response value 1		FB_PD_CHARGE response value 2	FB_PD_CHARGE response value 2	FB_PD_CHARGE response value 2	
780	FB_PD_CHARGE response value 3	FB_PD_CHARGE response value 3	FB_PD_CHARGE response value 3	FB_PD_CHARGE response value 3	FB_PD_CHARGE response value 3		FB_PD_CHARGE response value 4	FB_PD_CHARGE response value 4		
790	FB_PD_CHARGE response value 5	FB_PD_CHARGE response value 5			FB_PD_CHARGE response value 6	FB_PD_CHARGE response value 6			FB_PD_CHARGE response value 7	FB_PD_CHARGE response value 7
800	FB_PD_CHARGE response value 8	FB_PD_CHARGE response value 8			FB_PD_CHARGE response value 9	FB_PD_CHARGE response value 9			FB_PD_CHARGE response value 10	FB_PD_CHARGE response value 10
810	FB_PD_CHARGE response value 11	FB_PD_CHARGE response value 11			FB_PD_CHARGE response value 12	FB_PD_CHARGE response value 12				
820	FB_PD_LASTCHR response value 1	FB_PD_LASTCHR response value 1	FB_PD_LASTCHR response value 1	FB_PD_LASTCHR response value 1	FB_PD_LASTCHR response value 1		FB_PD_LASTCHR response value 2	FB_PD_LASTCHR response value 2	FB_PD_LASTCHR response value 2	
830	FB_PD_LASTCHR response value 3	FB_PD_LASTCHR response value 3	FB_PD_LASTCHR response value 3	FB_PD_LASTCHR response value 3	FB_PD_LASTCHR response value 3		FB_PD_LASTCHR response value 4	FB_PD_LASTCHR response value 4		
840	FB_PD_LASTCHR response value 5	FB_PD_LASTCHR response value 5			FB_PD_LASTCHR response value 6	FB_PD_LASTCHR response value 6			FB_PD_LASTCHR response value 7	FB_PD_LASTCHR response value 7
850	FB_PD_LASTCHR response value 8	FB_PD_LASTCHR response value 8			FB_PD_LASTCHR response value 9	FB_PD_LASTCHR response value 9			FB_PD_LASTCHR response value 10	FB_PD_LASTCHR response value 10
860	FB_PD_LASTCHR response value 11	FB_PD_LASTCHR response value 11			FB_PD_LASTCHR response value 12	FB_PD_LASTCHR response value 12				
870	FB_PD_HOUR response value 1	FB_PD_HOUR response value 1	FB_PD_HOUR response value 1	FB_PD_HOUR response value 1	FB_PD_HOUR response value 1		FB_PD_HOUR response value 2	FB_PD_HOUR response value 2	FB_PD_HOUR response value 2	

DB	0	1	2	3	4	5	6	7	8	9
880	FB_PD_HOUR response value 3	FB_PD_HOUR response value 3	FB_PD_HOUR response value 3	FB_PD_HOUR response value 3	FB_PD_HOUR response value 3					
890	FB_PD_HOUR response value 4	FB_PD_HOUR response value 4	FB_PD_HOUR response value 4	FB_PD_HOUR response value 4	FB_PD_HOUR response value 4					
900	FB_PD_HOUR response value 5	FB_PD_HOUR response value 5			FB_PD_HOUR response value 6	FB_PD_HOUR response value 6			FB_PD_HOUR response value 7	FB_PD_HOUR response value 7
910	FB_PD_HOUR response value 8	FB_PD_HOUR response value 8			FB_PD_HOUR response value 9	FB_PD_HOUR response value 9			FB_PD_HOUR response value 10	FB_PD_HOUR response value 10
920	FB_PD_HOUR response value 11	FB_PD_HOUR response value 11			FB_PD_HOUR response value 12	FB_PD_HOUR response value 12			FB_PD_HOUR response value 13	FB_PD_HOUR response value 13
930	FB_PD_HOUR response value 14	FB_PD_HOUR response value 14			FB_PD_HOUR response value 15	FB_PD_HOUR response value 15				

3 Modes of Operation

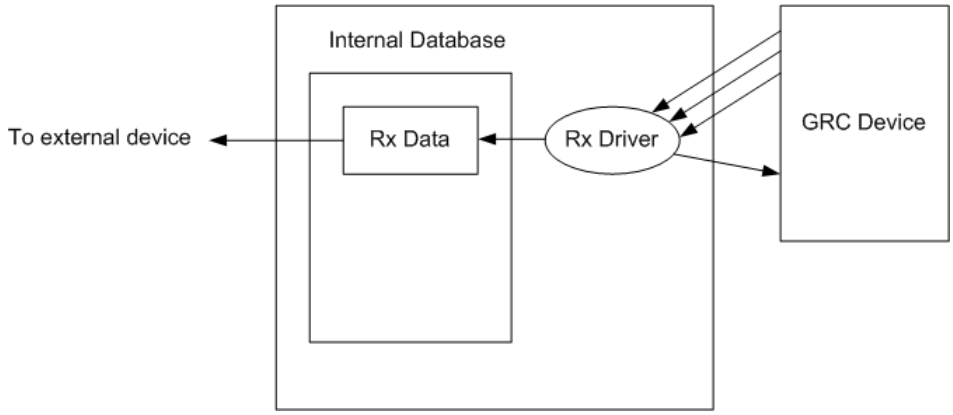
The module can operate in two different modes with each port acting independently. The configuration of each port's driver determines its mode of operation. The following sections describe these modes.

3.1 Data Flow

The following sections detail the flow of data between the pieces of hardware (GRC device and ProLinx Module). Each application port on the module is configured independently to interface with serial communication devices.

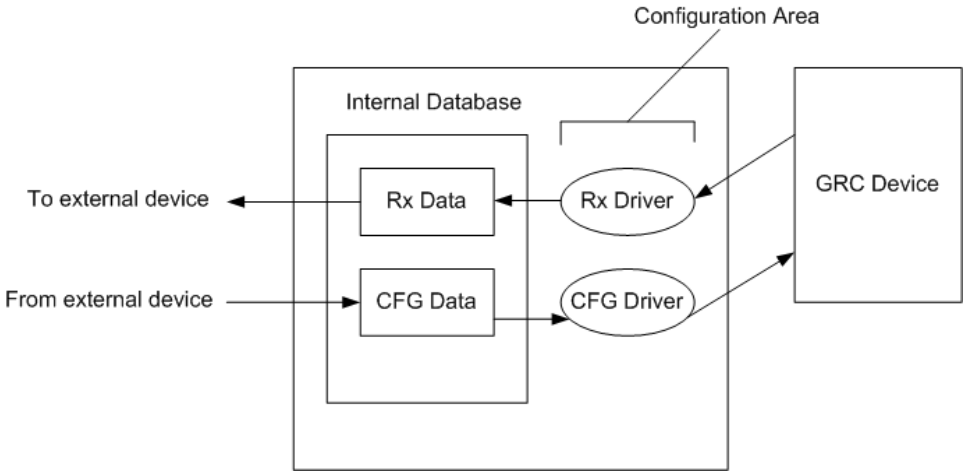
3.1.1 Receive Mode

A port on the module configured to function in receive mode is set up to receive multiple response data from a command to a GRC device. In this mode, the ProLinx module will never transmit data back to the GRC device. Any data received from the GRC device is passed from the receiver driver (Rx Driver) to the ProLinx module's internal database (Rx Data). This mode will only be activated by functions FB_ART_NAMES (1), FB_SENDEN (3), FB_PD (16), FB_ABLAGEN (17), and FB_FILLHEADS (18). The following diagram shows the flow of data on a port configured for receive mode.



3.1.2 Configuration Mode

A port configured in configuration mode can send and receive configuration data from a GRC device according to the command issued. Data flow to and from a GRC device is handled by the module's transmit and receive drivers. Data received from the GRC device is stored in the module's internal database in the configuration area. The following diagram shows the data flow when the port is configured for configuration mode:



3.1.2.1 Configuring a Port for Configuration Mode

In order to set a port to transmit data to configure a GRC device, information needs to be given to the module configuration (refer to section 2.2, GRCM Database Map table, for more information).

3.1.2.1.1 GRCM in a Network

GRCM can also be used with a GRC network (RS-485). To enable or disable this feature, within the configuration file, DFNTGRCM.CFG, either put “Yes” or “No” in the parameter, “Send with ID”. Then specify each port to a different ID according to database location specify in GRCM Database Map table. A value of “0” is also indicated that no network ID is specified. The module don’t put network ID in a command.

3.1.2.1.2 GRCM Article Name

In order to specify a specific article name for a GRC device, actual name need to be given to the GRCM module. The key word “current”, either upper or lower case, indicates sending command to the article currently opened (no article name is attached to a command).

3.1.2.1.3 Command Count

Each port has a maximum of 99 commands the module can be transmitted to GRC device. A value at the command count location indicates how many command need to be transmitted. Therefore more commands can be set, but only certain amount of commands can be specified in this database location to actually be transmitted.

3.1.2.1.4 Toggle Command

Parameter that uses in the GRCM is designed to dynamically be changed and transmitted commands on demand. In order to transmit a set of command to GRC device, a value “1” need to be put on database to toggle the action. This value will be clear automatically when all commands are sent to the GRC device

4 Driver Configuration

In order for the GRCM driver to function, a minimum amount of configuration data must be transferred to the module from the module's file system. Care must be taken in constructing the module configuration parameters. If the module does not function as expected, examine the configuration file using the Debugger Port on the module. All configuration parameters for the driver are found under the [GRCM Port x] section. The x in the section name will have a value of 0 to 3 corresponding to the appropriate GRCM port.

The following information provides an example of a GRCM configuration file:

```
# DFNTGRCM4.CFG
#
# This file contains the configuration for the DFNT/GRCM4 communication
# module.
#
# LOCATION      :
# DATE          : 05/21/2003
# CONFIGURED BY : JOE
# MODIFIED      :
#
# This section is used to define the configuration for the Module level
# data.
#
[Module]
Module Name : Test Example for 4202-DFNT-GRCM4 Communication Module


#-------------------------------------------------------------------------------
-
# This section is used to define the configuration for the master device
# simulated on network port
#
[DFNT Client 0]
Minimum Command Delay   : 100    #Minimum number of msec's between commands
Response Timeout        : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count             : 3      #Response failure retry count

[DFNT Client 0 Commands]
#
#   1     2      3     4    5  6                  7    8    9   10   11   12
#        DB   Poll       Swap                      Func File File  Elm  Sub
#Enab  Addr  Delay Count Code  Node IP Address Slot Code Type    #    #  Elm
START
#    1   200      0    10    0  192.168.0.149     -1  509    N   10    0
#    1   220      0    10    0  192.168.0.149     -1  509    N   10    0
END


[DFNT Client 1]
Minimum Command Delay   : 50     #Minimum number of msec's between commands
Response Timeout        : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count             : 3      #Response failure retry count

[DFNT Client 1 Commands]
#
#   1     2      3     4    5  6                  7    8    9   10   11   12
#        DB   Poll       Swap                      Func File  Elm  Sub
#Enab  Addr  Delay Count Code  Node IP Address Slot Code    #    #  Elm
```

```
START
#    1    50      0    10    0  192.168.0.101     -1  101    7    0   -1
END


#-------------------------------------------------------------------------
-
# This section is used to define the configuration for the GRCM master device
# simulated on Port 0.
#

[GRCM Port 0]
Enabled                   : Yes    #Y=Use port, N=Do not use port
Baud Rate                 : 9600   #Baud rate for port 300-57600
Parity                    : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits                 : 8      #5, 6, 7 or 8
Stop Bits                 : 1      #1 or 2
Min Response Delay        : 0      #0-65535 mSec before sending response msg
RTS On                    : 0      #0-65536 mSec before message
RTS Off                   : 0      #0-65536 mSec after message
Use CTS Line              : No     #Use CTS modem control line (Y/N)
Response Timeout          : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count               : 0      #Response failure retry count
Minimum Command Delay     : 10     #Minimum number of msec's between commands
Error Delay Counter       : 0      #0-65535 Command cycle count if error

Send With ID              : Y      #Send command with machine number (only work
with RS485)
Display Article Range     : 2      #1=1-10, 2=11-20, 3=21-30, ... , and 10=91-
100

#-------------------------------------------------------------------------
-
# This section is used to define the configuration for the GRCM master device
# simulated on Port 1.
#

[GRCM Port 1]
Enabled                   : Yes    #Y=Use port, N=Do not use port
RS Interface              : 0      #0=RS-232, 1=RS-485, 2=RS-422
Baud Rate                 : 9600   #Baud rate for port 300-57600
Parity                    : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits                 : 8      #5, 6, 7 or 8
Stop Bits                 : 1      #1 or 2
Min Response Delay        : 0      #0-65535 mSec before sending response msg
RTS On                    : 0      #0-65536 mSec before message
RTS Off                   : 0      #0-65536 mSec after message
Use CTS Line              : No     #Use CTS modem control line (Y/N)
Response Timeout          : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count               : 0      #Response failure retry count
Minimum Command Delay     : 10     #Minimum number of msec's between commands
Error Delay Counter       : 0      #0-65535 Command cycle count if error

Send With ID              : Y      #Send command with machine number (only work
with RS485)
Display Article Range     : 2      #1=1-10, 2=11-20, 3=21-30, ... , and 10=91-
100

#-------------------------------------------------------------------------
-
# This section is used to define the configuration for the GRCM master device
# simulated on Port 2.
```

```
#

[GRCM Port 2]
Enabled                   : Yes    #Y=Use port, N=Do not use port
RS Interface              : 0      #0=RS-232, 1=RS-485, 2=RS-422
Baud Rate                 : 9600   #Baud rate for port 300-57600
Parity                    : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits                 : 8      #5, 6, 7 or 8
Stop Bits                 : 1      #1 or 2
Min Response Delay        : 0      #0-65535 mSec before sending response msg
RTS On                    : 0      #0-65536 mSec before message
RTS Off                   : 0      #0-65536 mSec after message
Use CTS Line              : No     #Use CTS modem control line (Y/N)
Response Timeout          : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count               : 0      #Response failure retry count
Minimum Command Delay     : 10     #Minimum number of msec's between commands
Error Delay Counter       : 0      #0-65535 Command cycle count if error

Send With ID              : N      #Send command with machine number (only work
with RS485)
Display Article Range     : 1      #1=1-10, 2=11-20, 3=21-30, ... , and 10=91-
100

#-------------------------------------------------------------------------------
-
# This section is used to define the configuration for the GRCM master device
# simulated on Port 3.
#

[GRCM Port 3]
Enabled                   : Yes    #Y=Use port, N=Do not use port
RS Interface              : 0      #0=RS-232, 1=RS-485, 2=RS-422
Baud Rate                 : 9600   #Baud rate for port 300-57600
Parity                    : None   #N=None,O=Odd,E=Even,M=Mark,S=Space
Data Bits                 : 8      #5, 6, 7 or 8
Stop Bits                 : 1      #1 or 2
Min Response Delay        : 0      #0-65535 mSec before sending response msg
RTS On                    : 0      #0-65536 mSec before message
RTS Off                   : 0      #0-65536 mSec after message
Use CTS Line              : No     #Use CTS modem control line (Y/N)
Response Timeout          : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count               : 0      #Response failure retry count
Minimum Command Delay     : 10     #Minimum number of msec's between commands
Error Delay Counter       : 0      #0-65535 Command cycle count if error

Send With ID              : Y      #Y=Use ID, N=No ID, Send command with
machine number (only work with RS485)
Display Article Range     : 1      #1=1-10, 2=11-20, 3=21-30, ... , and 10=91-
100

#-------------------------------------------------------------------------------
-
# This section is used to define e-mail reports to be sent from the module
# to a specified e-mail server/user account based on the value of selected
# user register/value combinations.  When the specified register value contains
# the value defined, the e-mail file will be sent from the module.

[E-MAIL]
#    DB   Trigger     Mail          TO
#   Reg     Value     Server IP     Name          E-Mail File Name
START
     50         1     192.168.0.61  rich          stat
```

```
     50         2     192.168.0.61  rich          commands
     50         3     192.168.0.61  rich          errlist
     50         4     192.168.0.61  rich          emailcfg
     50         5     192.168.0.61  rich          example.rpt
END


#------------------------------------------------------------------------
-
# This section is used to move data within the database to concentrate
information
# for simpler data requests and control.  The From Address specifies the start
# database location to copy the number of registers set by Register Count to
# the specified To Address (destination of data).  When the data is copied,
# the order of the bytes can be altered using the Swap Code field as follows:
#
#  SWAP CODE   DEFINITION
#      0       Bytes left in original order   (1234 -> 1234)
#      1       Words are swapped              (1234 -> 3412)
#      2       Words and bytes are swapped    (1234 -> 4321)
#      3       Bytes in each word are swapped (1234 -> 2143)

[DATA MAP]
#   From         To    Register   Swap    Delay
#Address    Address       Count   Code   Preset
START
#    4000      2000           9      0     1000
#    4020      2010          10      0     1000
#    6300      2020          20      0     1001
#    6410      2040          10      0     1001
#    7900      2050          20      0     1002
#    8100      2070          20      0     1003
#    6810      3000      32      0     1000
END
```

The following table lists the parameters configured for each GRCM port:

[Section]/Item	Value	Range	Description
[CRCM PORT x]			Definition for specified GRCM port x.
Enabled:		Yes or No	This parameter is used to define if this port will be utilized. If the parameter is set to No, the port is disabled. A value of Yes will enable the port.
RS Interface:		Code 0 to 2	This parameter specifies the RS interface to be utilized when serial ports are used on the serial expansion module (Ports 1 to 3). The codes are as follows: 0=RS-232 1=RS-485 2=RS-422
Baud Rate:		Baud Rate Value	This is the baud rate to be used on the port. Enter the baud rate as a value. For example, to select 19K baud, enter 19200. Valid entries for this field include: 300, 600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600 and 115.

[Section]/Item	Value	Range	Description
Parity		N, O, E	N = None, O = Odd, E = Even
Data Bits		1 - 5	5, 6, 7, or 8
Stop Bits:		1 or 2	This parameter sets the number of stop bits to be used with each data value sent. Valid entries for this field are 1 and 2.
Min Response Delay		0 to 65535	This parameter sets the number of milliseconds to wait to respond to a request on the port. This is required for slow reacting devices.
RTS On:		0 to 65535	This parameter sets the number of milliseconds to delay after RTS is asserted before the data will be transmitted. Valid values are in the range of 0 to 65535.
RTS Off:		0 to 65535	This parameter sets the number of milliseconds to delay after the last byte of data is sent before the RTS modem signal will be set low. Valid values are in the range of 0 to 65535.
Use CTS Line:		Yes or No	This parameter is used to specify the handshaking used on the port. The code values are as follows: N=No hardware, Y=RTS/CTS hardware handshaking.
Response Timeout		0 to 65535	This parameter represents the message response timeout period in 1 –ms increments. This is the time that a port configured as a master will wait before re-transmitting a command if no response is received from the addressed slave. The value is set depending upon the communication network used and the expected response time of the slowest device on the network
Retry Count		0 to 10	This parameter specifies the number of times a command will be retried if it fails.
Minimum Command Delay		0 to 65535	This parameter specifies the number of milliseconds to wait between the initial issuance of a command. This parameter can be used to delay all commands sent to slaves to avoid “flooding” commands on the network. This parameter does not affect retries of a command as they will be issued when failure is recognized.

[Section]/Item	Value	Range	Description
Error Delay Counter		0 to 65536	This parameter specifies the number of polls to be skipped on the slave before trying to re-establish communications. After the slave fails to respond, the master will skip commands to be sent to the slave the number of times entered in this parameter.
Send with ID		Yes or No	This parameter specifies if a network ID is to be used. If the parameter is set to “Yes”, a network ID will be attached to the command. If the parameter is set to “No”, a network ID is not used.
Display Article Range		1 – 10	This parameter is set to allow the display of 10 article names at a time in the database area.

After setting up the configuration file, download it to the module using the Configuration/Debugger port.

5 Driver Status Data

Each GRCM port associated with the GRCM driver has an associated status data area. This data is located in the virtual address range of the module. The map data functionality of the module must be used to map this data into the normal data range of the module's database. The following table lists the content of the status data areas associated with each GRCM port driver:

Status Register	Description
Port 0 Status Data	
6300	Total Number of Commands
6301	Total Number of Response Commands
6302	Command Error Count
6303	Request Count
6304	Response Count
6305	Errors Sent
6306	Errors Received
6307	Configuration Error
6308	Current Error
6309	Last Error
Port 1 Status Data	
6700	Total Number of Commands
6701	Total Number of Response Commands
6702	Command Error Count
6703	Request Count
6704	Response Count
6705	Errors Sent
6706	Errors Received
6707	Configuration Error
6708	Current Error
6709	Last Error
Port 2 Status Data	
7100	Total Number of Commands
7101	Total Number of Response Commands
7102	Command Error Count
7103	Request Count
7104	Response Count
7105	Errors Sent
7106	Errors Received
7107	Configuration Error
7108	Current Error
7109	Last Error
Port 3 Status Data	
7500	Total Number of Commands
7501	Total Number of Response Commands
7502	Command Error Count

7503	Request Count
7504	Response Count
7505	Errors Sent
7506	Errors Received
7507	Configuration Error
7508	Current Error
7509	Last Error

If the module is configured correctly, the configuration error word should have a value of zero. Any other value indicates a configuration error. Use the value in the configuration error word to determine which set of parameters are invalid in the driver configuration area. The following table lists the bits associated with each configuration error in the word:

Bit	Code	Description
0	0x0001	Invalid selection for enabled parameter
1	0x0002	Invalid RS Interface parameter
2	0x0004	Invalid Baud rate
3	0x0008	Invalid Parity
4	0x0010	Invalid Data Bits
5	0x0020	Invalid Stop Bits
6	0x0040	Invalid Use CTS Line
7	0x0080	Invalid Rx DB Start
8	0x0100	Invalid Swap Rx Data Bits
9	0x0200	Invalid Rx Start Character
10	0x0400	Invalid Rx Term Character
11	0x0800	Invalid Download parameter
12	0x1000	Invalid Upload parameter
13	0x2000	Invalid Configuration Address
14	0x4000	Reserved
15	0x8000	Reserved

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